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CARIBBEAN SEA AND GULF OF MEXICO

INCLUDING THE

BAHAMA BANKS AND ISLANDS

AND THE

BERMUDA ISLANDS

VOL. I

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No. 86.

U. S. HYDROGRAPHIC OFFICE,
BUREAU OF NAVIGATION, NAVY DEPARTMENT.

THE NAVIGATION

OF THE

CARIBBEAN SEA AND GULF OF MEXICO.

Vol. I.

THIRD EDITION.

THE WEST INDIA ISLANDS, INCLUDING THE BERMUDA ISLANDS AND THE BAHAMA BANKS.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1892.

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JUL 11 1892
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PREFACE.

The coasts of Cuba, Haiti, and Puerto Rico are imperfectly laid down on the charts, and doubtless many shoals and dangers exist along these coasts of which there is no record.

The present edition of the work was compiled by Mr. R. C. Ray, U. S. Navy, from the following sources, viz: First edition by Commander F. M. Green, U. S. Navy; second edition by Lieuts. S. L. Graham and F. E. Sawyer, U. S. Navy.

Hydrographic Office Archives.

Office Naval Intelligence, Navy Department.

Consular Reports, State Department, and reports from United States Consuls in the West Indies, made to the Hydrographic Office especially for this publication.

The latest Hydrographic Office, Coast and Geodetic Survey, and British Admiralty charts.

U. S. Hydrographic Office, Coast and Geodetic Survey, and Lighthouse Board Notices to Mariners.

Atlantic Local Coast Pilot, Subdivision 22, U. S. Coast and Geodetic Survey.

West India Pilot, Vol. II, 1887, Admiralty.

Instructions Nautiques sur La Mer des Antilles, 1888, French Hydrographic Office.

Port Charges of the World, Theo. Hunter, 1889.

And late reports from officers cruising on United States Vessels of War.

RICHARDSON CLOVER,
Lieut. Commander, U. S. Navy, Hydrographer.

U. S. HYDROGRAPHIC OFFICE,
Washington, D. C., March 27, 1892.

NOTE.

The bearings, courses, and trend of the land are true; but for convenience the corresponding magnetic bearings, to the nearest degree, follow in brackets. (Variation in 1892.) The direction of the winds, the point from which they blow; of currents, the point toward which they set. Distances are expressed in nautical miles; soundings, unless otherwise stated, are reduced to mean low water.

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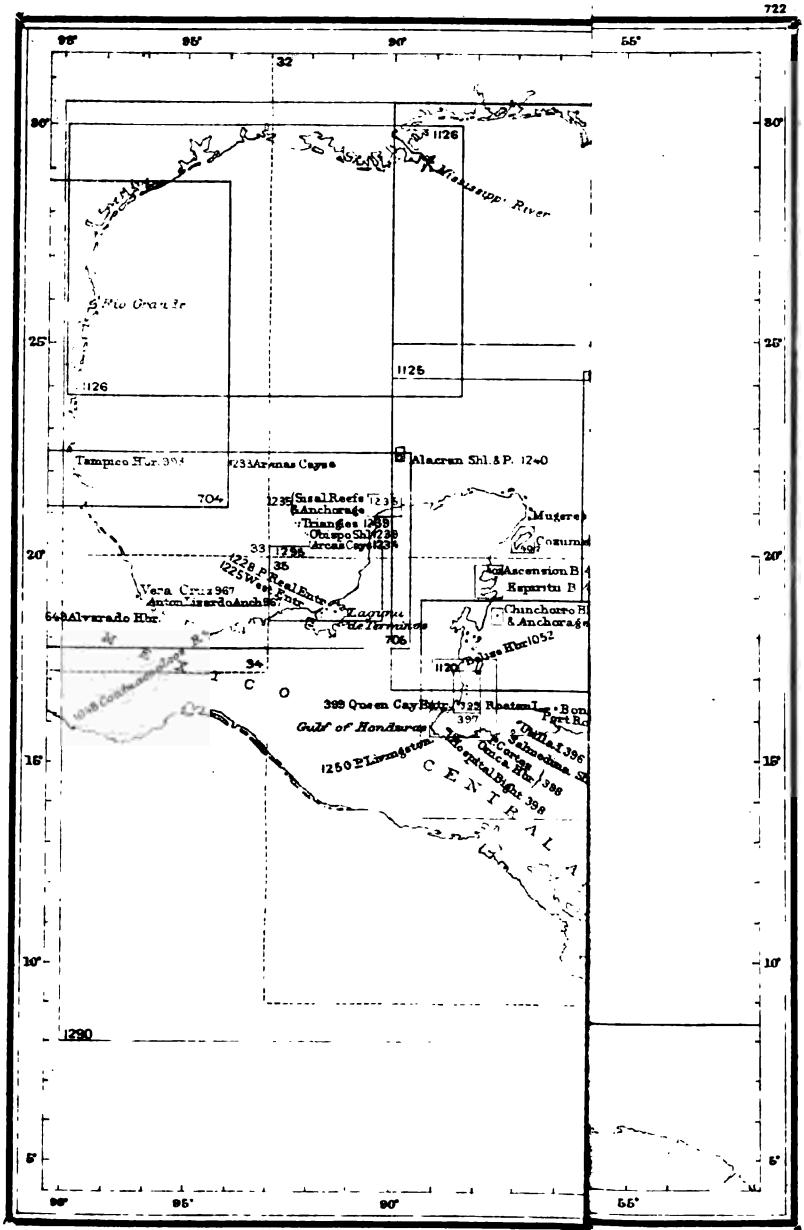


Division of Chart Construction. G.W. Littlehales, Assistant in Charge.

By R.E. Gray and W.F. Peabody.

CHAPTER I.

REMARKS ON WINDS, HURRICANES, CURRENTS, AND PASSAGES.

The West India Islands and the neighboring banks lie within the limits of the NE. trade winds, which blow from the eastward so constantly throughout the year as to have given rise to the terms "windward" and "leeward," universally employed to signify that a point is relatively to the eastward or westward.

These trade winds are subject to diurnal and annual modifications, and are at times temporarily interrupted by other winds of varying force and direction.

The diurnal variations to which the trade winds are subject near the coast are called land and sea breezes, which have especial characteristics for each locality. The sea breeze generally sets in about 9 a. m., and, blowing either directly on shore, or, according to the trend of the coast line, at an angle to it, continues till about sunset, when a calm interval is succeeded by a light air off shore, attaining its greatest strength about day dawn and being succeeded by an oppressive calm, to be again followed by the sea breeze. On the coasts of Cuba, Haiti, Puerto Rico, and Jamaica the regular sequence of land and sea breezes is seldom interrupted. In the Virgin and Windward Islands, as well as among the Bahamas, the land breeze does not usually occur; but during the night the trade winds are apt to die away, regaining their strength in the morning. Sailing vessels therefore usually endeavor to go to sea at early daylight.

The changes of seasons in the West Indies, as elsewhere, are produced by changes of the sun's declination. There is a dry and a rainy season, the exact dividing line between them varying somewhat from local causes; but, speaking generally, the rainy season lasts from June till November. During this season the wind inclines towards the SE., with torrents of rain. Calms and heavy squalls frequently occur, and hardly a year passes without a hurricane of more or less severity. This season is also known as the sickly season, from the great prevalence of dangerous fevers.

From November to June the wind draws more to the NE. and increases in strength, sometimes blowing a strong gale from this direction for two or three successive weeks in December, January, and February. Rain, though less frequent, is not of rare occurrence.

Occasionally strong winds from north and NW. interrupt the trades and blow very hard in the Gulf of Mexico and among the Bahama Islands. These are called Northers and occur from November to April.

These gales of wind bear a strong resemblance to the *pamperos* of the Rio de la Plata. Always heralding their approach by a heavy bank of clouds in the NW. and preceded by a light air from the contrary direction, accompanied by a falling barometer, they commence with a violent squall, gradually settling down into a fresh gale, which hauls to the NE. and east, ending with fine weather.

As the sun gets toward its extreme northern declination the rainy or hurricane season begins, and toward the middle of June rain falls in abundance. Hurricanes are very rarely experienced south of the tenth parallel, nor in the Caribbean Sea south of latitude 14° or 15° N., although the heavy swell from a distant storm is often felt. In the Caribbean Sea, east of the seventy-sixth or seventy-seventh meridian, the regular easterly trade winds generally prevail, interrupted, occasionally, near the land.

HURRICANES: GENERAL INFORMATION.

Season and Region.—Hurricanes are especially liable to be encountered from July to October, inclusive, in the tropics (north of the tenth parallel), the Gulf of Mexico, and Gulf Stream region. Earliest indications: Barometer above the normal, with cool, very clear, pleasant weather; a long, low, ocean swell from the direction of the distant storm; light, feathery cirrus clouds, radiating from a point on the horizon where a whitish arc indicates the bearing of the center. Unmistakable signs: Falling barometer; halos about the sun and moon; increasing ocean swell; hot, moist weather, with light, variable winds; deep red and violet tints at dawn and sunset; a heavy, mountainous cloud bank on the distant horizon; barometer falling more rapidly, with passing rain squalls.

Cyclonic Circulation.—One of the most important indications that an approaching storm is of hurricane violence is the marked cyclonic circulation of the wind, lower and upper clouds, etc. This may be easily appreciated by remembering that a cyclone of any great intensity is an ascending spiral whirl, with a rotary motion (in the Northern Hemisphere) against the hands of a watch, as shown on the diagrams. The surface wind, therefore, blows spirally inward (*not* circularly, except very near the center); the next upper current (carrying the low scud and rain clouds), in almost an exact circle about the center; the next higher current (the high cumulus), in an outward spiral; and so on, up to the highest cirrus clouds, which radiate directly outward. The angle of divergence between the successive currents is almost exactly two points of the compass Ordinarily, with a surface wind from north for instance, the low clouds come from the north also; on the edge of a hurricane, however, when the wind is north the cloud come from NNE., *invariably.* In rear of a hurricane, the wind blows more nearly inward; with a SE. wind, for instance, the center will bear about west, the low clouds coming from SSE. (two points to the right of the wind). Great activity of movement of the upper clouds, while

the storm is still distant, indicates that the hurricane is of great violence. If the cirrus plumes that radiate from the distant storm are faint and opalescent in tint, fading gradually behind a slowly thickening haze or veil, the approaching storm is an old one, of large area; if of snowy whiteness, projected against a clear blue sky, it is a young cyclone of small area, but great intensity.

Intensified Trade-wind Belt.—Another very important fact may be stated thus: When a hurricane is moving along the equatorial limits of a trade-wind region there is a belt of intensified trades to windward of its track; not until the barometer has fallen about $\frac{1}{10}$ of an inch is it safe to assume that, because the trade wind increases in force and remains steady in direction, you are on the track of the storm. By attempting too early to cross its track, running free as soon as the wind begins to freshen, you are liable to plunge directly into the vortex.

The Bearing of the Center of a Hurricane.—The 8-point rule, it should be understood, gives only an approximate idea of the bearing of the center, and it is probably less reliable in the dangerous than in the navigable semicircle. The best general rule is that *the center bears about 8 points to the right of the direction from which the low clouds come*, or, what is practically the same thing, *8 points to the right of the wind at the moment of a sudden shift in a heavy squall;* after such a shift the wind will remain steady in direction for a time but the center is meanwhile moving along and the angle of bearing changes until the next shift, when it becomes 8 points again.

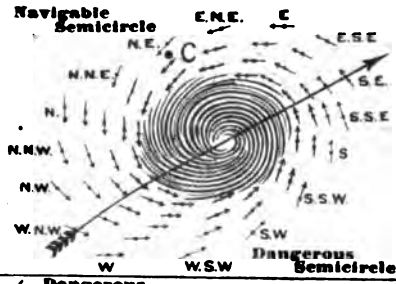
The accompanying diagrams are published every month on the Pilot Chart of the North Atlantic Ocean, and serve to indicate, by means of the *direction of the wind*, the probable bearing of the center. The small arrows fly with the wind, as stated at the margin. The shaded area at the center is the especially dangerous region the *core* or *heart* of the hurricane.

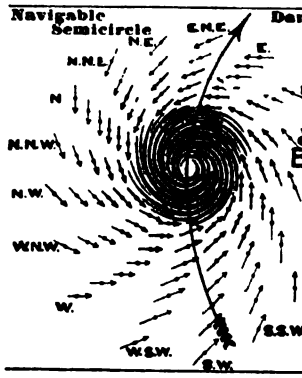
In the tropics, for instance, with squally, threatening weather, falling barometer, and wind NNE., your position is about A, on the lowest diagram. The center bears about SE. by E., and you are in the dangerous semicircle, in front of the approaching storm. See Rule 1.

If in about the latitude where hurricanes recurve, use the middle diagram. With wind from SE., for example, your position is about B, on the middle diagram, and the center bears about W. by S. See Rule 2.

If in high latitudes, where hurricanes generally move along a track bout NE. or ENE., use the first diagram. With a NE. wind your sition is about C, and you are probably in the navigable semicircle. e Rule 3.

IN HIGH LATITUDES: Velocity along track, 20 to 30 miles per hour.



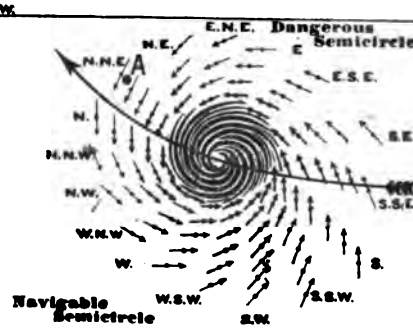


IN MIDDLE LATITUDES. STORM RECURVING: Velocity along track, 5 to 10 miles per hour.

NOTE.—Hurricanes recurve about the following latitude:

June and Oct., lat. 26° to 28° N.
July and Sept., lat. 27° to 29° N.
August, lat. 30° to 32° N.

IN LOW LATITUDES: Velocity along track, about 17 miles per hour.



DIAGRAMS FOR PRACTICAL USE IN WEST INDIAN HURRICANES.

BRIEF RULES FOR ACTION.

Caution: Read each of the following rules carefully and follow them strictly.

First. On the storm track. Second. Dangerous semicircle. Third. Navigable semicircle.

Rule 1.—If the squalls freshen without any shift of wind, you are on or near the storm track; heave-to on the starboard tack and watch for some indications of a shift, observing the low clouds particularly; if the barometer falls decidedly (say half an inch) without any shift, and if wind and sea permit, run off with the wind on the starboard quarter and keep your compass course.

Rule 2.—If the wind shift to the right, you are to the right of the storm track, in the dangerous semicircle; put the ship on the starboard

tack and make as much headway as possible until obliged to lie-to (starboard tack).

Rule 3.—If the wind shift to the left, you are to the left of the storm track, in the navigable semicircle; bring the wind on the starboard quarter and keep your compass course; if obliged to lie-to, do so on the port tack.

General rules, good for all northern hemisphere storms.—In scudding, always keep the wind well on the starboard quarter, in order to run out of the storm. Always lie-to on the coming-up tack. Remember that the usual ocean currents may be considerably changed for a time by the passage of a hurricane. Use oil to prevent heavy seas from breaking on board your vessel.

Squalls of more or less severity are common throughout the West Indies, especially during the summer months. They are generally of the arched form well known to sailors, and are almost always accompanied by thunder and lightning. They are most frequent near the land. White squalls, so called, are said to occur, giving little or no warning except the ripple on the water made by the wind. They are fortunately of very rare occurrence. Flaws of wind are frequently met with when coasting under high land, sudden gusts rushing down through the valleys. They should be carefully guarded against.

Currents.—Among the Windward and Virgin Islands, in the Mona, Windward, and Bahama Passages, on the shores of Puerto Rico Haiti, and Jamaica, and on the north coast of Cuba as far west as Matanzas, the current almost always sets to the westward with a force varying from ¼ knot to 3 and even at times 4 knots. This westerly current is felt, but with less constancy, on the eastern side of the Bahama banks and islands, and is due partly to the constant trade wind acting on the surface of the sea, and is partly a continuation of the great equatorial current which is deflected to the NW. by the coast of South America and moves swiftly and steadily through the passage between the islands of Trinidad and Grenada.

Though not invariably experienced the navigator should vigilantly guard against the effects of this probable current by never losing an opportunity by night or day of verifying his position.

In very many places the currents are much affected by the tides and still more affected by any interruption of the trade wind, as will be shown particularly when treating of such localities.

The leeward side of the Mona Passage in the vicinity of Cape Engaño nd the shores of the island of Anegada, before the establishment of the ht on Sombrero Island, have been strewn with numerous wrecks, owing vessels being set to leeward by this current.

Along the south coast of Haiti, inshore, a current of at least a knot hour has often been encountered setting to the eastward.

The most westerly point in the Florida Strait where the influence of Gulf Stream may be felt is difficult to determine. Sometimes an

easterly current of 2 miles an hour may be felt as far west as the meridian of the mouth of the Mississippi, but more frequently it commences between Havana and the Tortugas.

The navigator is referred to the general examination of the Atlantic Ocean, published by the U. S. Hydrographic Office, for detailed statements concerning the winds and currents of the Atlantic Ocean, which constantly influence with greater or less force the winds and currents of the Caribbean Sea and Gulf of Mexico.

Gulf Stream.—The following information is the result of the investigation of the currents of the Gulf Stream during 1885, 1886, and 1887, by Lieut. J. E. Pillsbury, U. S. Navy, commanding the Coast Survey steamer *Blake:*

BETWEEN FOWEY ROCKS, FLORIDA, AND GUN CAY, BAHAMAS.

The current varies daily in velocity, at times as much as $2\frac{1}{2}$ knots. The greatest velocity is about 9 hours before the upper transit of the moon. The variations are more excessive on the west side of the stream than on the east. (See table below.)

The average daily current varies during the month, the strongest set apparently coming a day or two after the moon's greatest declination, but the observations are not as yet sufficiently numerous to definitely establish the exact law of this variation.

The axis of the Gulf Stream at this point (the position of the greatest surface flow) is $11\frac{1}{2}$ miles east of Fowey Rocks lighthouse. The direction is always within a few degrees of north. The strongest surface current at the axis was $5\frac{1}{4}$ knots; the weakest, $1\frac{3}{4}$ knots; and the average current was $3\frac{8}{10}$ knots. For the average at other places, see table below.

There was evidence that the axis of the stream did not change its position with wind blowing across it. It was found that wind blowing against the current retarded the surface flow. It is probable that wind with the current increases its velocity.

Observations taken between April 6, 1885, and June 1, 1886.

Stations	1	1½	2	3	4	5
Distance of stations east of Fowey Rocks.....miles..	8	11½	15	22	29	36
Time of maximum flow before the moon's transit .....hours..	9	9	9	9	9	9
Average current .....knots..	2.6	3.6	3.2	2.8	2.4	1.8
Average maximum.....do....	3.06	4.87	3.86	3.06	3.32	1.99
Average minimum .....do....	1.89	2.85	2.54	2.56	1.86	1.47
Greatest current observed.....do....	4.63	5.25	4.53	3.20	2.54	2.50
Least current observed .....do....	0.31	1.75	2.12	2.07	1.80	1.12

BETWEEN REBECCA SHOAL AND CUBA.

The current varies daily in velocity in the same manner as previously discovered off Fowey Rocks, but the maximum velocity arrives at about $9^h\ 20^m$ before the transit of the moon.

The northern edge of the stream varies considerably in latitude, the average position of this limit, as shown by the observations made, being about 30 miles to the southward of Rebecca Shoal lighthouse.

The axis of the stream is situated about 65 miles south of Rebecca Shoal lighthouse, or 25 miles from the Cuban shore.

The direction of the flow at the axis is about east, but on either side the flow inclines toward the middle. At 5 miles distant from the coast of Cuba the average direction was N. 43° E. (N. 39° E. mag.), and at 5 miles inside the northern edge of the stream it was S. 58° E. (S. 62° E. mag.).

Observations taken between February 9, 1887, and May 9, 1887.

Stations	1	2	3	3½	4	4½	5
Distance of stations south of Rebecca Shoal ..... miles.	18	35	51	59	68	76	85
Time of maximum flow before the moon's transit ..hrs. min	.....	9:20	9:20	9:20	9:20	9:20	9:20
Average current ..... knots	.....	0.94	2.20	1.77	2.38	1.11	0.88
Average maximum ..... do	.....	1.55	2.71	2.20	2.72	.....	1.31
Average minimum ..... do	.....	0.57	1.87	1.30	1.62	.....	0.50
Greatest current observed. do	.....	2.42	3.73	2.21	3.06	1.45	1.77
Least current observed .... do	.....	0.16	1.56	1.25	1.34	0.65	0.12
Direction of flow	Var.	S. 58° E. (S. 62° E. mag.)	S. 83° E. (S. 87° E. mag.)	S. 78° E. (S. 82° E. mag.)	N. 83° E. (N. 79° E. mag.)	N. 66° E. (N. 62° E. mag.)	N. 43° E. (N. 39° E. mag.)

BETWEEN CUBA AND YUCATAN.

The current varies daily in velocity, the maximum arriving at 10h before the moon's transit.

The western limit of the stream is the Yucatan Bank, and its eastern limit is found about 20 miles distant from Cape San Antonio. In the space to the eastward of the stream (between its eastern limit and Cape San Antonio) there is an ebb and flow close inshore, and a set to the northward and eastward and to the southward and eastward between this inshore ebb and flow and the eastern limit of the stream. Probably, at times, there will be found a strong eddy current in this space to the eastward of the stream, but at the time of the observations the directions NE. and SE. were about equal on the surface, while below the surface the direction was always SE.

The axis of the stream is situated about 6 miles from the 100-fathom curve of the Yucatan Bank, in from 200 to 400 fathoms of water.

The direction of the flow *in the stream* is north at the axis, and about the same at all other parts.

A monthly variation, similar to that found off Fowey Rocks, is very marked here, the maximum arriving two or three days after the highest declination of the moon.

A trial anchorage, made off Cape Hatteras in 1,852 fathoms, indicated that this variation may be looked for at all parts of the stream.

Observations taken between March 24, 1887, and April 22, 1887.

Stations	1	2½	3	4	5	6
Distance of station from Yucatan toward Cape San Antonio...Miles..	15	30	45	60	75	90
Time of maximum flow before the moon's transit.....Hours..	.....	10	10	10	10	10
Average current.....Knots..	0.65	3.61	2.73	1.55	1.06	0.49
Average maximum.....do....	.....	4.99	.....	1.89	.....	.....
Average minimum.....do....	.....	2.45	.....	.....	.....	.....
Greatest current observed.....do....	1.17	6.32	3.31	1.95	1.38	0.82
Least current observed.....do....	0.51	1.99	2.51	1.21	0.96	0.24
Direction of current.....	N. 34° W. & N. 89° E. (N. 39° W. & N. 84° E. mag.)	N. 5° E. (North mag.)	N. 5° E. (North mag.)	N. 7° W. (N. 11° W. mag.)	N. 7° W. (N. 11° W. mag.)	S. 41° E. & N. 49° E. (S. 45° E. & N. 45° E. mag.)

NOTE.—The data for some of these stations are not complete, owing to the *Blake* having been unable to remain at anchor a sufficient length of time. The results given are those obtained from observations up to the present date, and are subject to modification by additional data.

Earthquakes.—Slight shocks of earthquake are very frequent among the islands of the West Indies, especially in the Virgin and Windward islands. They are sometimes strong enough to do serious damage on land, the most severe shocks having occurred at Guadeloupe and St. Thomas. The large majority of the shocks are, however, slight; the heavy sea waves, which frequently rise without any apparent cause and dash heavily against the shores of the islands, may be due, in some cases, to them. These rollers are most frequent in the eastern part of the West Indies, but occur at times on all the islands. They frequently make landing dangerous, and have been known to tear vessels from their anchorages and dash them ashore. They have been attributed to gales of wind prevailing at a distance, to interference between or union of the ordinary waves caused by the trades, and to earthquake shocks. Navigators, by noting all the attendant circumstances when these phenomena are perceived, will assist greatly in finding out the laws that govern them.

USUAL STEAMER ROUTES FROM NORTHERN PORTS OF THE UNITED STATES TO THE WEST INDIES, PORTS IN THE GULF, AND CARIBBEAN SEA.

For Havana or the Gulf of Mexico.—The route to be taken should be decided at Hatteras, according to the weather; but steamers generally use the inside track, between the land and the Gulf Stream, and make a straight course to Hatteras Shoal, thence in 17 fathoms of water to Cape Canaveral, after passing which there is no trouble night or day, the coast to Jupiter Inlet being clear from danger. By using the lead a safe course can be steered, free from tide or current. From Jupiter down, coast inside the stream; during the day keep the Florida reefs just in sight and at night be guided by the lights, making a direct course for Cuban or Mexican ports when clear of the keys. If bound to United States Gulf ports, pass to the westward of the Tortugas.

In the homeward trip the strength of the stream is used, and steamers do not leave it until off, or north of, Hatteras, when a direct course for port is made.

Steamers using the eastern route (outside the stream), when off Hatteras cross the Gulf Stream, then run for the NW. point of Matanilla Reef, and where it bears S. 56° W. (S. 55° E. mag.) recross to Jupiter Light and continue as before directed. (See last paragraph p. 35.)

To the Bahamas.—The Boston steamers, after clearing Nantucket shoals, make direct course for port of destination and return by same route, except during winter months, when they follow the stream to Hatteras, then north edge of the stream to latitude of Delaware Bay, when a course is set for Nantucket. Other steamers make direct course for Hatteras to port of destination and return by same route.

From Cape Canaveral to Nassau the best route is to Jupiter, then across to Great Isaac, and through the NW. Providence Channel to Nassau.

For South Shore of Cuba, Haiti, Jamaica, or Central American Ports.—From Boston set direct course for Watling Island; from other northern ports keep inside of stream until off Hatteras, then steer directly for Watling Island, pass through Crooked Island Passage, round Cape Maysi, thence to destination, remembering and allowing for the westerly current, which increases in strong easterly winds on north shores of Cuba.

Going north after leaving Watling Island, set course for Hatteras; if bound to Boston and in good weather, shape course for Vineyard sound; if weather threatens, keep inside the stream.

For Santo Domingo, Puerto Rico, and ports on north shore of South America.—After making Hatteras as before stated, steer for Mona Passage and then for destination.

For the Windward Islands and ports in Venezuela.—From Hatteras set course for Sombrero Island Light, through Anegada Passage, and to destination.

SAILING VESSELS.

In general, bound south, the object to be gained is to make eastings, so that when the northern limit of the trades is reached the port to which bound should bear a little west of south, in summer about SSW., excepting when bound into the Gulf of Mexico, when the course should be as far west as possible, the wind often being more favorable near the eastern edge of the Gulf Stream than it is a degree or more to the eastward. The Crooked Island Passage should not be used bound south and west, but the passage through Hole in the Wall and around Great Isaac is safe, and from Isaac's south the stream is not much felt on its eastern edge.

Returning to the United States.—From all ports to windward the best course is the direct one, using that passage which lies nearest the

course. Vessels should run the trades out by the wind or a little free, crossing the thirtieth parallel in about longitude 72°. From the Gulf vessels should run in the stream as far north as latitude 36° and longitude 74°.

From the Windward Islands, with strong trades, many vessels run through to leeward of the islands, cross Caribbean Sea round Cape San Antonio, and follow the stream. If northerly or westerly winds should be met, use the Windward and Crooked Island Passages, crossing the Gulf Stream off Hatteras.

CHAPTER II.

THE BERMUDA ISLANDS.

This group was formerly called the Somers Islands, from Sir George Somers, who was shipwrecked here in 1609.

They were first settled by the English 1612, and have remained ever since in their possession. The group consists of over 360 islands, most of which are small and surrounded by dangerous reefs nearly even with the surface of the water. Access is extremely difficult. The principal ones which are inhabited are St. George, St. David, Hamilton, Somerset, and Ireland. The population is about 14,500, of whom 6,000 are white.

The government is administered by a military governor appointed by the British Government. This group forms a most important military and naval station, all commanding points being strongly fortified.

The United States is represented by a consul and vice-consul.

There is a complete dockyard establishment at Ireland Island, with every requisite for refitting and docking large ships.

The principal trade is with the United States, large quantities of fresh vegetables being exported there. Steamers from New York arrive and depart every two weeks from July to December, inclusive, and weekly during the rest of the year. There is a monthly steamer between Halifax, Turks Island, and Jamaica; also monthly steamers between St. John, New Brunswick, and the Windward Islands, all calling at Hamilton going and returning.

There is a submarine cable between Halifax and Bermuda; office, at Hamilton.

Being situated between the parallels of 32° and 33° N., about an equal distance from the West India Islands and British North America, the climate is a mean between the two, partaking neither of the extreme heat of the one nor of the excessive cold of the other. Owing to the Gulf Stream, which passes between the Bermudas and the United States, the climate is greatly ameliorated, the winter months resembling the early part of October in England, but without its frost. Gardening is pursued during this part of the year, while the tropical productions of the West Indies are cultivated during the heat of the summer.

The winter, or cold season, is the most agreeable, and lasts from November to March. In the latter part of February spring commences,

and the weather usually continues mild, with refreshing showers and gentle breezes from south and west, until the end of May. In June the summer sets in, and the weather becomes hot. Calms now succeed to the gentle breezes of May, the air is sultry and oppressive, and long droughts are common, which are often broken up by heavy thunder-storms. In September the weather changes its character, and becomes again mild and agreeable. Hurricanes and tempests are frequent, and few autumns pass without them, of more or less violence; the squalls are heavy and sudden, occurring particularly in the winter season.

The whole of these islands lie on the SE. side of an oval-shaped coral reef. On the northern and northeastern edge the reef is under water, with a ledge here and there showing above it at low water, with a single rock called the "North Rock," rising to the height of 8 feet. Approaching from the southward the land is low, rising nowhere to a greater height than 260 feet, but by far the greater part forming gentle undulations of from 20 to 60 feet above the sea level. The area of the islands is about 12,000 acres, but only 1,200 are under cultivation. The principal islands are well wooded, chiefly with the Bermudian cedar, which with its close and rigid foliage of the darkest green gives a gloomy character to the woods at a distance. They are irregularly hilly, and the valleys contain a rich vegetable soil, capable of producing abundant crops of arrowroot, potatoes, and other vegetables, which are largely exported, as is also a small quantity of straw plat and tropical fruits. There is a total want of springs and wells of fresh water, and it has become an almost universal custom to collect the rain water from the roofs, which is carefully led into tanks and forms the only supply of pure water. The roofs as well as the walls are whitewashed, and the white roofs gleaming among the dark trees is characteristic of Bermuda.

Pilots can be obtained off St. David Head upon a signal being given for one. Information is telegraphed from one part of the island to another by the chain of signals. The pilots are competent, but for the St. George Channel do not go out very far. They use small boats, either whale boats or gigs, which are very sharp. They are divided into two classes of government pilots. There are 27 in all, 12 at the west end and 15 at the east end of the group. The pilot charges are reasonable, being so much per foot, more being charged for going in than for coming out and more for sailing vessels than for steamers When a vessel shifts her berth half pilotage is charged. Two dollars and a half per day is charged for detention. The rates are regulated by government. Complaints against pilots can be made before any Mayor or Justice of the Peace.

Light Dues are 8 cents per ton.

Coal can be obtained either at Grassy Bay, Murray Bay, or at St. George. Anthracite, Cardiff, Welsh, or Cape Breton is kept on hand, but the former in a limited quantity. Price varies from $7 to $9 per ton. In the port of St. George coaling is done with wheelbarrows and

is rapid; at Murray Anchorage, from hulks with baskets, and very rarely interrupted by storms; at Grassy Bay, from hulks and at the rate of 10 tons per hour, and interrupted by winter gales. Water costs half cent per gallon delivered in casks from Hamilton. It is rain-water. It can also be procured from the dockyard in steam tank vessels. Provisions cost 30 per cent more than in New York. Butcher's meat is imported from New York. Fruit is scarce, except bananas.

Wharfage.—Vessels of 100 tons when actually discharging, $1.20 per day; larger vessels pay in proportion; about 25 cents for every 50 tons over 100.

The Reef.—From North Rock the reef trends about E. by N., and east for nearly 5 miles, passing 5½ miles northward of St. Catherine Point, when it sweeps around to the SE. and south and terminates ½ mile from St. David Head. There are several narrow openings through this great barrier, leading into secure anchorages, but only one navigable for ships of large draft.

The SE. side of the remarkable reef, from which the Bermudas rise, from St. David Head to the lighthouse, is bounded by the islands which lie in most parts within ¼ of a mile of the edge with the 100-fathom line about a mile beyond it; the depth of 10 fathoms being almost alongside the reef. Nearly abreast Gibbs Hill lighthouse, the reef extends a mile from the shore and thence takes a westerly direction for about 8 miles, and the outer detached parts are called the SW. breaker, Chaddock, Little, and Long Bars. It then sweeps round to the north and NE. passing about 6 miles from Somerset Island, continuing with an outward curve to North Rock.

Channels.—The channels through the outer reef, commencing at North Rock, the most northern are as follows:

North Rock Channel.—There are two channels on either side of this rock, but as they are narrow and intricate and only known to a few pilots they are seldom used.

Mills Breaker Channel is the next to the eastward, and the entrance is ½ mile to the northward of the Mills Breaker, which is marked by an iron buoy, bearing N. 22° E. (N. 30° E. mag.) 2¾ miles from St. David Head. It is only used by Bermudian vessels.

The Narrows or **Ship Channel** is next south of Mills Breaker Channel and is entered from the Five-Fathom Hole. It is narrow and intricate, and without buoys it would be impassable, even with the help of pilots, who are guided mostly by the eye. No marks are available, nd it is impossible to give directions.

Buoyage.—The following is now the buoyage of the Narrows or ip Channel, which, as regards shape and color, is in general accord h the uniform system adopted in Great Britain.

The buoys on the starboard hand entering from the seaward are nical buoys, painted black, and those on the port hand are can buoys, inted black and white.

The following are the starboard hand buoys:

NE. buoy is *conical*, black, with the words 24 FEET painted on it; moored on the northern side of the eastern entrance to the Narrows, close southwestward of a 24-foot patch, with the center of Fort Cunningham bearing S. 60° W. (S. 68° W. mag.), distant 1,220 yards; and St. David Head S. 5° E. (S. 3° W. mag.).

No. 1 buoy is *conical*, black; moored close southward of a 25-foot patch, with the center of Fort Cunningham bearing S. 47° W. (S. 55° W. mag.), distant 1,140 yards; and St. David Head S. 11° E. (S. 3° E. mag.).

No. 2 buoy is *conical*, black; moored southward of a 27-foot patch, with the center of Fort Cunningham bearing S. 30° W. (S. 38° W. mag.), distant 1,180 yards; and eastern end of Fort Catherine N. 66° W. (N. 58° W. mag.).

No. 3 buoy is *conical*, black; moored at the southern extreme of Sea Venture Shoals, with the eastern end of Fort Catherine bearing N. 68° W. (N. 60° W. mag.), distant 1,860 yards; and center of Fort Cunningham S. 10° W. (S. 18° W. mag.).

No. 4 buoy is *conical*, black; moored at the southwestern extreme of Sea Venture Shoals, with the eastern end of Fort Catherine bearing N. 73° W. (N. 65° W. mag.), distant 1,600 yards; and center of Fort Cunningham South (S. 8° W. mag.).

No. 5 buoy is *conical*, black; moored southward of a 23-foot patch, with the eastern end of Fort Catherine bearing S. 19° W. (S. 27° W. mag.), distant 720 yards; and center of Fort Cunningham S. 25° E. (S. 17° E. mag.).

No. 6 buoy is *conical*, black; moored southward of a 6-foot patch, with Tobacco Rock bearing S. 31° W. (S. 39° W. mag.), distant 860 yards; and center of Fort Cunningham S. 25° E. (S. 17° E. mag.).

No. 7 buoy is *conical*, black; moored southwestward of a 17-foot patch, with Tobacco Rock bearing S. 16° W. (S. 24° W. mag.), distant 900 yards; and center of Fort Cunningham S. 28° E. (S. 20° E. mag.).

Inner Narrows buoy is a large *conical* buoy, black, with the words INNER NARROWS painted on it, and surmounted by a pole. It is moored on the northern side of the western end of the Narrows, with Tobacco Rock bearing south (S. 8° W. mag.), distant 980 yards; and center of Fort Cunningham S. 31° E. (S. 23° E. mag.).

The following are port hand buoys:

No. 1 buoy is *can*, checkered black and white, surmounted by a pole. It is moored near the northeastern extreme of the shoals eastward of Fort Cunningham, with the center of that fort bearing S. 76° W. (S. 84° W. mag.), distant 1,400 yards; and St. David Head S. 10° W. (S. 18° W. mag.).

Fairway buoy is *can*, checkered black and white, with the word FAIRWAY painted on it. It is moored on the southern side of the eastern entrance to the Narrows, close eastward of a 24-foot patch, with the

center of Fort Cunningham bearing S. 61° W. (S. 69° W. mag.), distant 1,150 yards; and St. David Head S. 7° E. (S. 1° W. mag.).

No. 2 buoy is *can*, checkered black and white, surmounted by a pole. It is moored close northeastward of a 19-foot patch, with the center of Fort Cunningham bearing S. 40° W. (S. 48° W. mag.), distant 1,080 yards; and St. David Head S. 16° E. (S. 8° E. mag.).

No. 3 buoy is *can*, checkered black and white. It is moored close northward of a depth of 16 feet on the northern side of Southern Narrows patch, with the center of Fort Cunningham bearing S. 12° W. (S. 20° W. mag.), distant 1,220 yards; and east end of Fort Catherine N. 67° W. (N. 59° W. mag.).

No. 4 buoy is *can*, checkered black and white. It is moored eastward of a 6-foot patch, with Tobacco Rock bearing N. 71° W. (N. 63° W. mag.), distant 1,660 yards; and center of Fort Cunningham S. 8° E. (S. mag.).

No. 5 buoy is *can*, checkered black and white. It is moored on a 12-foot patch, with Tobacco Rock bearing S. 74° W. (S. 82° W. mag.), distant 720 yards; and center of Fort Cunningham S. 25° E. (S. 17° E. mag.).

No. 6 buoy is *can*, checkered black and white. It is moored on the eastern side of a shallow patch, with Tobacco Rock bearing S. 29° W. (S. 37° W. mag.), distant 660 yards; and center of Fort Cunningham S. 29° E. (S. 21° E. mag.).

No. 7 buoy is *can*, checkered black and white. It is moored on the southern side of the western end of the Narrows, with Tobacco Rock bearing S. 2° E. (S. 6° W. mag.), distant 880 yards; and center of Fort Cunningham S. 31° E. (S. 23° E. mag.).

The buoys hitherto marking the Narrows or Ship Channel have been withdrawn.

St. George Channel, south of the seaward extreme of the Narrows, is the channel over the bar to St. George Harbor. On the northern part of St. David Island are leading marks for crossing the bar. The northern one is a tall stake painted white; the southern, a broad stone pillar, white with a black stripe down the middle and sea face.

Halfway between these marks and Fort Cunningham is the entrance to the harbor. A small rocky islet, Governors Island, lies nearly in the center of the channel, and on its southeastern side is a white stake, one of the marks for the Manhattan Shoal; and about 150 yards S. 50° W. (S. 58° W. mag.) of it is the inner stake. The shoal is close to the entrance of the harbor and a black pole is moored on it in 14 feet of water, rocky bottom.

The bar channel is marked by white buoys on the western side and ack buoys on the eastern. From the Five-Fathom Hole, with the lar and stake on St. David Island, in line bearing S. 17° W. (S. 25° . mag.), the least depth carried is 18 feet. After passing the first ır buoys a white pole will be seen on the Elbow, which leave to the

westward. When the marks for Manhattan Shoal are on, keep them on until nearly up to the black pole, leaving it on the port hand or to the southward and then steer in with Whale House, a low white building on the north side of Smith Island, well open to Paget Island, passing in midchannel, northward of Governors Island; thence the best channel is rather nearer the north shore, avoiding the shoals extending northwestward of Paget Island. From 14 to 16 feet at low water will be found on the bar connecting Ordnance and Hen Islands, westward of which there is good and secure anchorage in St. George Harbor in from 5 to 7 fathoms, stiff clay, perfectly landlocked.

Boiler Channel is southeastward of St. George Channel and along by the shore of St. David Island, and is used when the weather is moderate and the wind scant through St. George Channel. This channel is very narrow and only available for vessels of moderate draft and in charge of pilot. The leading mark through is Whale House, showing over the SE. part of Paget Island, bearing S. 82° W. (west mag.) and the least water (avoiding patches) is 15 feet.

Castle Harbor, the next opening, is about 2 miles southwestward of St. David Head. It leads into Castle Harbor, which is full of shallows and never used for commercial purposes.

Hog Fish Cut is at the SW. end of the Principal Island, about 2 miles westward of the Gibbs Hill lighthouse, through which small island vessels thread their way by the eye into Elies Harbor. This snug little basin is formed between the ends of the Principal and Somerset Islands. On the NW. part of the former there is a small conical hill about 150 feet high, called Wreck Hill, which is very conspicuous and a useful object in approaching from the north or south.

On the west side of the reef are three more openings, through which small traders find their way into Grassy Bay and Hamilton Harbor, passing close along the NW. side of Ireland Island, but no directions can be given for them.

Tides.—It is high water full and change about 7h. 14m., both at St. George and the Principal Islands. The rise at springs is about 4 feet, but is uncertain. At neaps the rise is sometimes not more than one foot. Northerly winds cause the highest and southwesterly the lowest tides. The force of the stream is also variable and probably affected by the current prevailing outside.

The flood from the eastward round St. David Head sets into St. George harbor and through the Narrows nearly in the direction of the channel to off St. Catherine Point, where it sweeps around to about WSW. and sets from ¼ knot to 2 knots an hour, according to the force of the wind. The ebb runs with the same force from the SW. toward St. Catherine Point, where it diverges to ESE., trending more southerly eastward. Off St. George it is strengthened by the stream through the ferry and harbor to seaward. About the Sea Venture Shoals, on the north side of the Narrows, it sets in all directions and stronger about the buoys

near these shoals, which is the narrowest part of the channel. The floods in the offing set to the NE. and the ebbs to the SW., but, as has already been seen, nearer the shore they set in various directions.

Anchorages.—Murray Anchorage, lying inside the reef and entered through the Narrows or Ship Channel, is safe for well-found vessels, there being from 6 to 10 fathoms of water and good holding ground. With a NW. gale there is a heavy sea, which cuts off communication from shore.

The boat landing at old naval tank is very poor, the sandy beach just beyond, sheltered by the rocks, being better.

At Murray Anchorage foreign vessels of war anchor till permission is received from the governor to go nearer the dockyard.

Grassy Bay, the man-of-war anchorage, is not much better than Murray Anchorage, unless a vessel can go to a naval buoy, its advantage being its proximity to the drydock. A breeze from any direction raises a disagreeable sea. There are four sets of mooring buoys in the bay.

Five-Fathom Hole Anchorage, sometimes called Jervis Roadstead, is open to all winds from WNW. round by north to SSW., with no protection from the sea except what the reefs afford, and that only from the former bearing to NNE. It may therefore be considered nothing more than a stopping place for a pilot. In favorable weather, with the wind from NW., a vessel may anchor in from 7 to 9 fathoms of water, with St. Catherine Point bearing N. 70° W. (N. 62° W. mag.), but care should be taken to select a clear sandy spot; for the darker ones, which may be generally detected from aloft, especially on a bright sunny day, are rocky coral heads, and by anchoring on them the loss of the anchor is risked. Be prepared to leave the anchorage the moment the winds begin to veer.

Leading Mark.—Cherrystone Hill, seen through the Town Cut, bearing S. 85° W. (N. 87° W. mag.) leads in from seaward clear of all dangers to Five-Fathom Hole Anchorage, whence vessels may enter the Narrows of St. George Harbor.

St. George is the northeastern island of the group. On the south side of the northern part the land forms an elbow, and here there is a considerable town, formerly the seat of government, and in front of it a secure harbor, protected by St. David and other islands, for vessels of 16 or 18 feet draft, which can cross the bar at high water.

There is a marine railway at St. George, where vessels of 1,200 tons can be taken up, and repairs of all kinds, except to machinery, can be well and quickly made.

On the bluff of St. Catherine Point, the NE. extreme of St. George ıd of the whole group, Fort Catherine stands conspicuous from its olated appearance, a narrow strip connecting it to the higher land at e back, which is steep and moderately wooded on its northern side. ort Victoria, crowning the summit about 150 feet above the sea, is dis-

tinguished by its flagstaff and yard, and here every vessel approaching the island is signaled. To the SW. of the latter is Fort George, 164 feet above the sea.

St. David Island.—Its shores are very irregular and its east end terminates in a bold rocky promontory, between 70 and 80 feet high, thickly covered with cedar, called St. David Head, which forms the eastern extremity of the group.

Light.—A lighthouse stands on Mount Hill about ⅓ mile SW. of St. David Head, from which at an elevation of 208 feet above the sea a fixed light is exhibited which should be visible 20 miles. The light is visible between S. 46° E. (S. 38° E. mag.) and N. 44° E. (N. 52° E. mag.) over an arc of 270°. Bearing S. 42° E. (S. 34° E. mag.) it is obscured by the land about Fort Victoria. The light tower has been seen from the masthead 25 miles distant; it shows up well and is the first object seen when making the land from the northeastward.

Higgs Island is close SE. of the new fort on St. George Island and divides the passage between that island and Paget Island into two boat-passages, the northern of which is called Town Cut.

Paget Island is about ⅓ mile in length, and at its SE. end is Fort Cunningham.

The Principal Island of the group is connected with St. George by a causeway and with Somerset by a bridge. Its shores, however, are very irregular, and so is its surface. The highest part, called Gibbs Hill, near the SW. end of the island, is 230 feet high.

Hamilton stands near the center of the island, on the north side of Hamilton or Crow Lane Harbor, and is the seat of government. The harbor is convenient, well sheltered, and capable of receiving vessels of 16 or 18 feet draft alongside the wharf in front of the town.

Large numbers of visitors, attracted by the mild climate, come here from the United States to spend the winter.

Light.—A white circular iron lighthouse stands on the round, barren, rocky summit of Gibbs Hill, which exhibits at 362 feet above the sea line a light revolving once every minute; the light should be visible in clear weather 24 miles. It is obscured by the land between the bearings S. 42° W. (S. 50° W. mag.) and S. 46° W. (S. 54° W. mag.) also between S. 47° W. (S. 55° W. mag.) and S. 56° W. (S. 64° W. mag.)

Somerset Island is generally not so elevated as the others.

Ireland, the northern island, is entirely occupied by the Government establishments.

Dock.—The iron floating dock is 381 feet long over all, 330 feet insi the breadth of entrance is 83¾ feet. To take a ship drawing 25 feet dock requires to be in at least 50 feet of water. All kinds of repairs c be made.

Time Signal.—A time ball is dropped from a flagstaff at the do yard, Ireland Island, at noon local mean time (Saturdays only), cor sponding to 4h. 19m. 18.3s. mean time at Greenwich.

Bank of soundings outside encircling reef.—The soundings outside the reefs gradually deepen from 7 to 8 fathoms to 30 and 35 fathoms, and then suddenly to no bottom at 100 fathoms. Thus on the east side the 100-fathom line is found at 3 miles distant from the reef, on the south side 1½ miles, on the SW. extremity about 5 miles, and on the north and west sides 2 to 3 miles.

Argus Bank is 6 miles in extent, east and west (between the 100-fathom lines of soundings), and 5½ miles north and south. The least water obtained, 10 fathoms, is on a spot covering a small area, bottom reddish brown coral, situated S. 42° W. (S. 50° W. mag.), 26 miles from Gibbs Hill lighthouse. Several casts of 20 fathoms have been obtained, but the general depth is 30 fathoms, the bottom chiefly composed of coral with occasional rock and sand patches. It is probable that in bad weather the sea would break on the 10-fathom patch.

Argus Bank abounds in fish; snappers and large rockfish are plentiful.

The surface currents during the sounding operations of the Argus were found to be weak and irregular. On Argus Bank on one occasion the current set to the SE. at the rate of ¾ mile an hour.

General Directions.—In steering for Bermuda at night or in thick weather it is advisable not to go to the northward of the parallel of 32° 5′. In coming from the SE., St. David light will likely be the first seen, and should not be brought to the southward of S. 70° W. (S. 78° W. mag.), or during the night approached nearer than 6 or 7 miles. Coming from the westward, Gibbs Hill light will be the first one seen, and it should be kept at the distance of 10 or 12 miles until it bears northward of N. 48° E. (N. 56° E. mag.). A vessel from the northward sighting the light should haul off immediately, as the reefs extend off in that direction 16 miles.

The Bermuda Islands are about 240 miles to the southward and 400 to the eastward of the outer limits of the Gulf Stream. Hence the current in the neighborhood is exceedingly variable, both in force and direction. Generally, however, it appears to be greatly influenced by the wind, particularly if it has blown from the same point for several days, when its velocity may be found to be one knot an hour, or more, in the opposite direction. The utmost attention to the reckoning is therefore requisite, and should the vessel's position be at all doubtful, and the weather unfavorable for seeing the light, the parallel should not be crossed in the night time, for the edge of the bank is too close to the reef for soundings to give safe warning.

The islands appear to lie near the northern limit of the variable winds, and also on the track of hurricanes and revolving storms passing off and along the shore of America, which is distant about 600 miles. The revolving winds which pass over the islands vary in strength from breezes to storms. In the summer season the winds are light and usually steady for a considerable time, blowing in straight lines or on

one point, with but little fluctuation in the barometer. But after the commencement of November veering winds, of various degrees of force, set in and gradually become frequent, yet they seldom follow in such rapid succession as that one gale becomes confounded with another. Light winds and very fine weather usually intervene between the passing of revolving winds, while, at other times, hard-blowing straight-line winds with a high barometer are experienced.

The arrival of such succeeding progressive rotary winds is indicated by the barometer falling, as well as by the increase of the wind's force, which will often occur suddenly. Except in the case of great storms perfect regularity in the fall and rise of the barometer, and in the changes of the wind, will not be found; for the direction of the wind, as well as the atmospheric pressure, is no doubt modified by other revolving gales or strong winds blowing at the same time, but when whirlwind, tempest, or hurricanes blow they overpower such irregularities.

In the winter season northerly winds sometimes blow hard without veering for two and three days together. The air is then dry and cold, and while the thermometer falls the barometer remains stationary, or rises a little. Misty weather is very uncommon, but it constantly happens that a change of weather is first announced by increase of both temperature and moisture in the air. The December gales generally commence from the south, veer round by the west, and terminate at about NW. or NNW.

During the winter months most of the gales which pass along the coast of North America are revolving gales. Vessels from Bermuda, bound to that shore, should therefore put to sea when the NW. wind, which is the conclusion of a passing gale, is becoming moderate, and the barometer is rising to its usual level. The probability is, more particularly in the winter season, that after a short calm the next succeeding wind will be easterly, the first part of a fresh revolving wind coming up from the SW. quarter.

A ship bound to New York or the Chesapeake might sail while the wind is still west and blowing hard, provided the barometer indicates that this west wind is owing to a revolving gale which will veer to the northward. But as the usual track which gales follow in this hemisphere is northerly or northeasterly, such a ship should be steered to the southward. As the wind at west veers toward NW. and north, the vessel would come up, and at last make a westerly course, ready to take advantage of the east wind at the setting in of the next revolving gale.

A vessel at New York and bound to Bermuda, at the time when a revolving gale is passing along the American coast, should not wait in port for the westerly wind, but sail as soon as the first portion of the gale has passed by and the NE. wind is veering toward the north, provided it should not blow too hard; for the north wind will veer to the westward, and become every hour fairer for the voyage to Bermuda.

A great number of gales pass along the coast of America, following nearly similar tracks, and in the winter make the voyage between Bermuda and Halifax very boisterous. These gales, by revolving as extended whirlwinds, give a northerly wind along the American continent, and a southerly wind on the whirlwind's opposite side far out in the Atlantic. In sailing from Halifax to Bermuda, it is desirable for this reason to keep to the westward, as affording a better chance of having a wind blowing at north instead of one at south, as well as because the Gulf Stream sets vessels to the eastward.

When vessels from Barbados or its neighboring West Indian Islands sail to Bermuda on a direct course, they sometimes fall to the eastward of it, and find it very difficult to make when westerly winds prevail. They should, therefore, take advantage of the trade wind to make the meridian 68° or 70° of longitude before they leave the parallel of 25° N.

CHAPTER III.

THE STRAITS OF FLORIDA AND THE FLORIDA KEYS.

General Description.—The Straits of Florida commence in about latitude 27° 25′ N., between the Little Bahama Bank and the east coast of Florida. Thence they sweep around to the southward and westward to the Dry Tortugas, a distance of about 300 miles. They are included between the Florida coast and its outlying keys and reefs on the west and north, and the Bahama Banks, Cay Sal Bank, and the coast of Cuba on the east and south.

Through this long and comparatively narrow passage the current of the Gulf Stream sets to the eastward and northward with varying velocity but great regularity in direction. The strength of this current on the surface is influenced by the wind and tides, and varies in different parts of the straits. Eleven and a half miles east of Fowey Rocks the strongest surface current was found to be 5¼ knots, and the weakest 1¾ knots, the average current being 3 $\frac{6}{10}$ knots, and the set nearly north.

The general direction of the current follows the trend of the Florida coast. On its eastern and southern edges it sets close home upon the Bahama Banks, Cay Sal Bank, and the coast of Cuba in the vicinity of Havana. On its western edge it sets home on the Florida shore from Alligator Reef to Jupiter Inlet. To the westward of Sombrero Key a counter current or eddy, setting to the westward, will sometimes be found one to 2 miles outside of the line of reefs.

The great velocity of the Gulf Stream and the strength with which it at times sets upon the reefs and banks render the navigation of these straits, by sailing vessels bound to the southward and westward, both tedious and dangerous, and the difficulties are enhanced by the want of convenient anchorages and by the abrupt rise of the banks and reefs from very deep water, which prevents the lead from giving warning of the proximity of danger until it may be too near to be avoided. This combination of unfavorable conditions induces sailing vessels bound to the southward and westward to avoid the straits as far as possible by entering through the Providence Channels, and if of sufficiently light draft crossing the Great Bahama Banks. Bound to the northward, the strong current is so greatly in their favor as to more than counterbalance the difficulties of navigation. The navigation of the straits has been greatly facilitated by the establishment of lights and numerous beacons along the Florida Reefs. By the aid of

these, steamers, or sailing vessels if they have a leading wind, may skirt the reefs in safety, sufficiently close to partly avoid the adverse current, and often finding a favorable eddy after passing Alligator Reef. Vessels drawing less than 10 feet, when down to Cape Florida, may pass inside the reefs and follow the Hawk Channel to Key West, thus avoiding the adverse current of the Gulf Stream in a most dangerous part of the straits, and finding comparatively smooth water with all winds.

Winds.—The Straits of Florida lie within the region of the NE. trades, but these winds do not blow over the straits with the same regularity as over the open ocean. The prevailing winds are from the eastward, however, during the entire year—from the southward of east in summer, and from the northward of east in winter. During the hurricane months "the straits are liable to be swept by terrific cyclones." As a rule the progressive motion of these storms, in this latitude, is to the westward and northward. They are most liable to occur during the months of July, August, September, and October. In the winter heavy Northers are frequent. They blow generally from NW. to north, hauling as a rule to the northward and eastward, and rarely backing. Their approach is nearly always heralded by a heavy bank of clouds in the NW., preceded by light airs from the contrary direction, and accompanied by a falling barometer; they commence with a violent squall, gradually setting down to a fresh gale. Vessels caught in the narrower parts of the straits in these gales are subject to a most trying sea. SE. gales occur at intervals also during the winter. They usually commence to blow at about ENE., freshing rapidly with a falling barometer and rising thermometer, and hauling to the southward and eastward, obtain their greatest force at about SE.

Florida Coast.—Cape Canaveral is low and sandy. A shallow bank, on which the sea nearly always breaks, extends from it in a southeasterly direction.

There is good anchorage, sheltered from northerly and westerly winds, with the lighthouse bearing about N. 34° E. (N. 32° E. mag.).

The Anchorage is marked by an iron can buoy with black and white perpendicular stripes. A vessel seeking anchorage should bring this buoy and the lighthouse in range, bearing N. 34° E. (N. 32° E. mag.), and anchor when within ½ mile of the buoy.

Ohio Shoal lies N. 31° E. (N. 29° E. mag.) of the lighthouse. Bull Shoal bears N. 48° E. (N. 46° E. mag.) of the same point. These two shoals are quite small. North of the Ohio Shoal there is also a small shoal patch. In rough weather the sea breaks on these shoals, but at other times they can not be seen, and as they are steep-to, and quite dangerous to approach; by keeping east of the whistling buoy off Hetzel Shoal all danger will be avoided.

Shoal.—The steamer Saratoga drawing 18 feet 4 inches, touched on a shoal with Cape Canaveral lighthouse bearing S. 30° W. (S. 28° W.

mag.) and buoy on Hetzel Shoal bearing S. 15° E. (S. 17° E. mag.). Soundings of 10 fathoms were obtained previously, and 5, 8, and 10 fathoms after striking. Soundings to the north and west of Hetzel Shoal vary from those shown on the chart, and between Hetzel Shoal and the latitude of Mosquito Inlet lighthouse on a course N. 4° W. (N. 6° W. mag.) from Hetzel Shoal buoys the soundings are not correct as shown on the chart.

The Coast in the neighborhood of Cape Canaveral is like the cape itself, low, barren, and sandy. All along the shore as far south as Jupiter Inlet a narrow lagoon extends, separated by a strip of sand beach from the sea and having inshore of it extensive cypress swamps.

Life-saving stations have been established by the United States Government at intervals along the shore.

From Indian River to Jupiter Inlet the coast line has the same general direction, and continues low and sandy. Off this part of the coast there are several small shoal lumps, which will be avoided by keeping 10 miles off shore north of St. Lucie Inlet.

From Jupiter Inlet the coast takes a southerly direction to Virginia Key, where the sandy shore ends and the Florida Reefs commence. The coast is generally formed of sandy hillocks covered scantily with brushwood, black rocks being interspersed here and there. The shore is generally clear of danger.

LIGHTS.

Cape Canaveral.—On the NE. pitch of the cape, from a conical tower, a light, flashing white every minute, is shown at an elevation of 139 feet, and should be visible 17¾ miles.

Jupiter Inlet.—On the north side of the inlet, from a brick tower, a fixed white light, varied by a white flash every 90 seconds, is shown at an elevation of 146 feet, and should be visible 18¼ miles.

Fowey Rocks.—On the rocks, from a dark brown pyramidal framework on a pile foundation, a fixed white light is shown at an elevation of 111 feet, and should be visible 16¼ miles.

Carysfort Reef.—On the reef, near the edge of the Gulf Stream, from a dark brown pyramidal framework on pile foundation, a light, flashing white and red, interval between flashes 5 seconds every third flash, is shown at an elevation of 143 feet, and should be visible 18 miles.

Alligator Reef.—On the NE. point of the reef, from a white pyramidal framework on black pile foundation, a light, flashing white and red with two flashing red sectors, intervals between flashes 5 seconds, is shown at an elevation of 143 feet, and should be visible 18 miles. The light will show flashing red between the bearings S. 42° W. (S. 39° W. mag.), and S. 60° W. (S. 57° W. mag.) over an arc of 18°, covering beacon 'E' on Conche Reef and black buoy No. 9; also between the bearings N. 67° E. (N. 64° E. mag) and N. 50° E. (N. 47° E. mag.), over an arc of 17°, covering beacon 7 on Tennessee Reef and red buoy No. 12. In all other

directions the light will show flashing red and white, every third flash red.

Sombrero Key.—On Sombrero Shoal, from a brown pyramidal framework on pile foundation, a light, fixed white is shown at an elevation of 144 feet, and should be visible 18 miles.

American Shoal.—On the shoal, from a dark brown pyramidal framework on pile foundation, a light, flashing white every 5 seconds, is shown at an elevation of 110 feet, and should be visible 16¼ miles.

Sand Key.—On the center of key, from a brown pyramidal framework on pile foundation, a light is shown at an elevation of 110 feet, and should be visible 16¼ miles. The light is a flashing white and red light with 2 flashing red sectors; interval between flashes 5 seconds. It will show red between the bearings S. 50° 30′ W. (S. 47° 30′ W. mag.), and S. 84° 30′ W. (S. 81° 30′ W. mag.), over an arc of about 34°. and between the bearings N. 87° E. (N. 84° E. mag.), and N. 73° E. (N. 70° E. mag.), over an arc of about 14°, covering Western Dry Rocks. In all other directions the light will show white.

Key West.—At the southern edge of the town, from a white tower a light, fixed white, is shown at an elevation of 72 feet, and should be visible 14 miles.

Northwest Passage.—On flats to mark channel of bar leading to Northwest Channel from a white screw-pile structure, a light is shown at an elevation of 50 feet, and should be visible 12½ miles. The light is fixed white with a fixed red ray between S 14° W. (S 11° W. mag.) and S. 18° W. (S 15° W. mag.)

Rebecca Shoal.—On the shoal, from a square dwelling surmounted by a lantern on pile foundation, a light is shown at an elevation of 67 feet, and should be visible 13¾ miles. The light flashes alternately red and white; interval between flashes, 5 seconds.

Dry Tortugas.—On Loggerhead Key, from a conical tower a light, fixed white, is shown at an elevation of 152 feet, and should be visible 18½ miles.

Tortugas Harbor.—On SE. bastion of Port Jefferson, Garden Key, from a black skeleton tower, a light, fixed white, is shown at an elevation of 65 feet, and should be visible 13½ miles.

Florida Keys.—From Virginia Key a chain of small islets, covered with mangrove trees and called the Florida Keys, extend to the West and SW. for nearly 200 miles, ending at the Dry Tortugas. They are skirted on the side next to the straits, throughout their whole extent, a chain of dangerous reefs and shoals lying at an average distance about 5 miles from the line of keys.

The reefs are the more dangerous from the fact that they seldom show above water, and in smooth weather are not marked by breakers. On the outer edge of and between the reefs the water will be found to shoal very abruptly.

In approaching the reefs you will generally be warned of their proximity by a difference in the color of the water, which will change from deep blue to light green. Too much dependence, however, must not be placed upon this warning. In clear weather you may run in safely by the lights and beacons. In thick weather you must depend almost entirely upon the lead. Soundings in 100 fathoms will assure you of being within about 5 miles of the reefs, and strangers should be cautious about approaching nearer in thick weather. Fogs, however, are not frequent in this locality.

Vessels standing to the southward along the Florida coast and intending to pass outside the reefs, should haul off into 10 fathoms of water on arriving off Virginia Key by day, or shortly after making Fowey Rocks light at night. They will thus avoid a chain of shoal spots with from 12 to 16 feet of water lying off Key Biscayne and running parallel to that shore at a distance of 3 miles. The northernmost of these spots is marked by a first-class nun buoy, painted red and marked "Cape Florida" in large white letters. It lies due east from Virginia Key, distant 2¼ miles. Vessels bound south through the straits will leave this buoy on the starboard hand. Small vessels bound into the Hawk Channel will leave it on their port hand.

Reef Beacons.—To warn vessels of their approach to these dangerous reefs, beacons have been planted at intervals along the seaward edge of the dangers, and so marked as to distinguish them from each other. These beacons are of iron, each of the series marking the line of the reef being surmounted by a lattice-work cylinder, the top of which is 36 feet above high water. They are distinguished by vanes marked by a letter or number large enough to be distinctly seen from a safe distance, as they may be approached from seaward within a few hundred yards.

In passing along the edge of the reefs it must be remembered that the current frequently sweeps very strongly on to the reefs; the navigator should, therefore, constantly verify his position by bearings of the beacons and lighthouses.

Key West is the most important of the Florida Keys on account of its excellent harbor and the city situated upon its western end.

The island is low, sandy, and in many places barren, yet a considerable portion of its surface is covered with trees and bushes. In approaching the city the most conspicuous objects are two white towers on the south beach of the island, and Fort Taylor, a large brick fortification near the city.

Key West Harbor is commodious and accessible to vessels dra ing 30 feet. The outer harbor is open to the southward, and affords rough but safe anchorage with winds from that quarter. The inner Man-of-War Harbor, into which 4 fathoms may be carried, furnishes smooth, safe anchorage in all kinds of weather. Vessels drawing le than 10 feet of water may always enter this harbor with ease and safe

as there is nothing in the way of that draft that is not so plainly marked as to be readily avoided. Sailing vessels with a greater draft than 10 feet, unless with a good leading breeze, should always take a pilot. Steamers and sailing vessels with leading breezes, may enter without difficulty by attention to the directions and the chart.

A United States naval storehouse and coal depot are located here.

Dock.—There is an "End Dock" at Key West, belonging to the United States Government, but vessels whose bottoms need repairing amidship must be docked elsewhere.

Communications.—There is telegraphic communication between Key West and the mainland, and with Havana. Steamers running between New York and Galveston, between Tampa and Havana, and between New Orleans and Havana stop at Key West en route.

Weather Signal Station.—There is a United States Weather Signal Station at Key West, where cautionary and storm signals give timely warning of approaching bad weather.

Pilots are constantly cruising outside, and strangers should always employ one. A pilot can also be obtained by making a signal off the bar.

All vessels entering or leaving, which do not require a pilot, must pay half pilotage if spoken. The pilot who brings a vessel in is entitled to take her out.

Rates.—Vessels drawing 6 to 10 feet, $3 per foot; drawing 10 to 14 feet, $4; drawing 14 to 20 feet, $5; drawing over 20 feet, $6.

Quarantine.—The boarding station is at a buoy with a yellow flag on it, off the marine hospital. Vessels must not pass this buoy until they have obtained pratique. If at night, sailing vessels should anchor outside the buoy; in the day they may heave to. The quarantine anchorage is in Man-of-War Harbor, above Fleming Key.

Hospital.—There is a United States Marine hospital which is open to foreign as well as American seamen, but the former must pay $1 per day.

Supplies of all kinds, coal, ice, fresh provisions, water, etc., can be obtained in Key West at all times and in any desired quantities.

Entrance Channels.—The principal passages into the harbor of Key West are Southeast Channel, the Main Ship Channel, Southwest Channel, and Northwest Channel.

Dangers.—The most important dangers lying off the entrance are Speculator Shoal, Eastern Sambo, Middle Sambo, Western Sambo, Eastern Dry Rocks, Rock Key, Sand Key, Western Dry Rocks, and Middle Ground. Besides these principal dangers there are numerous other shoal spots and patches with from 10 to 18 feet of water over them, which have no names, and of which it would be useless to attempt a detailed description. All are well shown on the charts, and many of them are marked by buoys.

The south shore of the island of Key West should not be approached

nearer than ¾ mile, as the shoals make out nearly to that distance, and within the 3-fathom line there are many spots with only from 2 to 4 feet of water.

Whitehead Spit.—This spit makes off from the SW. point of Key West Island. Its extremity is marked by Red Buoy No. 6, which lies in 30 feet of water, and must be left on the starboard hand by vessels entering the harbor.

Middle Ground Shoal lies to the westward of the island of Key West, distant about ½ mile. Its southeastern end forms the western boundary of the harbor and is marked by two buoys—South Middle Ground Buoy, black, No. 11, lying in 18 feet of water on the south end of the shoal, and Inner Middle Ground Buoy (black, No. 13), lying in 18 feet of water on the NW. side of the harbor, Both these buoys must be left to port by vessels entering and anchoring in the harbor.

Frankford Bank is an extensive shoal lying to the northward of the outer harbor and to the westward of the inner harbor and Man-of-War Harbor. Its south point is marked by a Black Buoy, No. 15, which lies in 20 feet of water. It marks the northern limit of the outer harbor, and must be left to port by vessels entering the inner harbor.

Southeast Channel.—The least depth of water in this channel is 4¼ fathoms, but it is narrow at some points, having shoal spots near it with from 14 to 18 feet over them. Sailing vessels should not attempt to enter by it unless they have a good leading wind.

Directions.—Keep in 15 fathoms, and do not bring Sand Key lighthouse to bear to the southward of S. 88° W. (S. 85° W. mag.) until Key West lighthouse has been brought to bear N. 39° W. (N. 42° W. mag.). Run for it, being careful to keep exactly on the bearing N. 39° W. (N. 42° W. mag.). You should pass on your starboard hand, about 100 yards distant, Western Sambo Buoy (red, No. 2), then on the same hand and same distance Middle 15-foot Head Buoy (red, No. 4), and continuing on the same bearing you should make Hawk Channel Turn Buoy (black and white perpendicular stripes). When up to it pass it on either hand and change your course to N. 77° W. (N. 80° W. mag.). A run of 2 miles on this course will lead up to Whitehead Spit Buoy (red, No. 6).

NOTE.—Vessels drawing over 14 feet of water should not attempt to run this channel in the night on account of the numerous 15, 17, and 18 foot heads on both sides of the channel, which is narrow.

To Enter the Harbor from Whitehead Spit Buoy.—Steer N. 3° E. (north mag.). until South Middle Ground Buoy (black, No. 11) bears N. 87° W. (west mag.). distant about 350 yards, and then change your course to N. 26° E. (N. 23° E. mag.). This course, if made good, will take you along about the middle of the channel and directly up to the city front, or, if continued, lead into Man-of-War Harbor. You will pass on your port hand, distant about 150 yards, Black Buoy No. 15, marking the southern end of Frankford Bank, and then, on same hand

and at about the same distance, Black Buoy No. 17, marking the eastern edge of Frankford Bank and the western side of the harbor.

From Whitehead Spit Buoy (red, No. 6) you may steer N. 3° E. (north mag.) for about 1¼ miles, and anchor when nearly up to Black Buoys Nos. 13 and 15, in the outer harbor, in 4 or 5 fathoms.

Main Ship Channel.—The least depth of water in this channel is 30 feet. A portion of it is quite narrow, but the dangers are all well marked; and steamers or sailing vessels with a leading wind should find no trouble in entering by it in daytime, but those of over 15 feet draft should not attempt to enter at night.

The entrance to this channel is about 5 miles from Key West lighthouse, and is about ⅝ mile in width between a 17-foot spot to the eastward and a 13-foot spot to the westward. Neither of these spots is marked, but about midway between them is the entrance buoy (black and white perpendicular stripes), which should be passed close aboard on either hand.

Directions—Entering by Day.—When in not less than 15 fathoms bring Key West lighthouse to bear north (N. 3° W. mag.), and steer for it till Sand Key lighthouse bears S. 82° W. (S. 79° W. mag.), when you should be up with the entrance buoy. Pass on either side of this buoy, close aboard, and change course to N. 5° W. (N. 8° W. mag.). On this course stand in, passing about 200 yards to the eastward of Western Head Buoy (black, No. 1), 100 yards to the westward of Mississippi Shoal Buoy (red, No. 2), and about midway between the East and West Triangle Buoys (Nos. 3 and 4). Continue your course N. 5° W. (N. 8° W. mag.), beyond the latter buoy for ⅝ mile, when Sand Key lighthouse will bear S. 47° W. (S. 44° W. mag.), then change course to N. 31° W. (N. 34° W. mag.), and stand on, passing to the southward and westward of Whitehead Spit Buoy (red, No. 6).

By Night.—Vessels of more than 15 feet draft should not attempt to enter this channel at night, but those of less may enter by the following directions: Bring Key West light to bear north (N. 3° W. mag.), and stand in for it, getting from 4¾ to 6½ fathoms, with possibly a cast or two of 17 feet. When Sand Key light bears S. 47° W. (S. 44° W. mag.), you should open Northwest Channel light, bearing N. 42° W. (N. 45° W. mag.), and you will head for it on that course, getting 5 to 6 fathoms. Stand on N. 42° W. (N. 45° W. mag.) till Sand Key light bears S. 31° W. (S. 28° W. mag.), when bring that light over your stern and stand up the harbor N. 31° E. (N. 28° E. mag.). Anchor in fathoms when Key West light, which will be shut in by Fort Taylor as you pass, is again opened. Or you may continue on the same course and run up to the city wharves.

A good lookout should be kept so as not to foul the buoys in the Main Ship Channel.

Southwest Channel.—This channel is very convenient for vessels approaching from the southward and westward. Five fathoms may be

carried in by close attention to the sailing directions, but it is not recommended to strangers drawing more than 17 feet, unless in steamers, or in sailing vessels with a good leading breeze for running all the courses. For 17 feet it gives a straight course right up to the entrance of the harbor. All the dangers but one, a 17-foot spot, are well marked.

Directions.—Get Sand Key lighthouse to bear N. 79° E. (N. 76° E. mag.) and run for it until Key West lighthouse bears N. 55° E. (N. 52° E. mag.). Run for it on that bearing until abreast of Inner 16-foot Shoal Buoy (red, No. 6), where change your course to N. 58° E. (N. 55° E. mag.). Pass to the westward of Whitehead Spit Buoy.

Vessels not drawing over 18 feet may enter by this channel by bringing Key West lighthouse to bear N. 55° E. (N. 52° E. mag.) and running for it, keeping the bearing fine until up to Whitehead Spit Buoy. This course passes close to the outer 16½-foot spot, marked by a buoy, and the 16-foot spot marked by Buoy No. 4.

Northwest Channel.—This channel is a slue through the shoal bank. For the greater part of its length it has from 3 to 4 fathoms of water and an average width of about ½ mile. Eleven feet can be carried through.

Directions—By Day.—Keep in 5 fathoms until you bring Northwest Passage lighthouse to bear S. 14° W. (S. 11° W. mag.). Run for it on this bearing. Pass the bell buoy on either hand close-to, and Buoy No. 1 about 300 feet, and Beacon No. 3 and Buoy No. 5 about 100 feet on the port hand. Haul sharp around No. 5 buoy, leaving the red pile beacon on the starboard hand, and steer S. 46° E. (S. 49° E. mag.) for Key West lighthouse. Pass Mid-Channel Buoy close on either hand, and when up to Black Buoy No. 7, Sand Key lighthouse bearing S. 9° W. (S. 6° W. mag.), change your course to S. 31° E. (S. 34° E. mag.). Pass Buoy No. 9 about ¼ mile on your port hand and Inner Mid-Channel Buoy close-to on either hand. When up to the latter buoy you will have Sand Key lighthouse bearing S. 19° W. (S. 16° W. mag.) and Key West lighthouse S. 59° E. (S. 62° E. mag.). Pass about 200 yards to the southward of "Governor Marvin" Wreck Buoy and then steer for the town. Black Buoys Nos. 11, 13, 15, and 17 may be passed on either side, as none of them are in less than 18 feet of water.

By Night.—Bring Northwest Channel light to bear S. 14° W. (S. 11° W. mag.) and run for it on that bearing, keeping in the northern edge of the red rays till Key West light bears S. 46° E. (S. 49° E. mag.), when steer for it on that bearing until Sand Key light bears S. W. (S. 6° W. mag.); now change course to S. 31° E. (S. 34° E. mag.) and run on it till you have Sand Key light bearing S. 19° W. (S. 16° W. mag.) and Key West light S. 59° E. (S. 62° E. mag.), when change course to S. 53° E. (S. 56° E. mag.). Now, when Sand Key light bears S. 30° W. (S. 27° W. mag.) change your course to N. 30°

(N. 27° E. mag.), keeping the light exactly astern, for the city wharves or anchorage.

Marquesas Keys are the westernmost of the Florida Keys. They lie in about longitude 82° 10′ W., and are midway between Key West and the western extremity of the bank. The group consists of a number of low, irregularly-shaped islands, occupying together a length of about 4 and a breadth of about 3 miles. There is a wide channel across the bank between Boca Grande Key and the Marquesas Key.

The shoal bank separating the Straits of Florida from the Gulf of Mexico extends west from the Marquesas Keys 17 miles. It is called The Quicksands. The depth of water varies from 5 to 18 feet. Its extreme west end is known as the Halfmoon Shoal, on which there is a least depth of only 6 feet. Isaac Shoal and Rebecca Shoal lie to the westward of Halfmoon Shoal, the former 4½ and the latter 6½ miles.

Boca Grande Channel.—This channel, lying just to the eastward of Marquesas Keys, has a least depth of 11 feet. It is of very little importance to vessels going to or leaving Key West, but it forms a short cut from the Gulf Stream into the Gulf of Mexico.

The dangers of this channel consist of the extensive flats to the eastward and westward of it.

Directions.—Keep in 5 fathoms until you get North Entrance Buoy (black and white perpendicular stripes) to bear south (S. 3° E. mag.), in range with Mid-Channel Buoy (black and white perpendicular stripes), when steer for it and leave it on your port hand. Steer a fine south (S. 3° E. mag.) course, pass Mid-Channel Buoy on either side, and continue the same course through to South Buoy (black and white perpendicular stripes).

The Passage between the Quicksands and the Tortugas is obstructed by Halfmoon, Isaac, Rebecca, and New Ground Shoals. Halfmoon Shoal is marked by a red can buoy; New Ground Shoal by a red nun buoy, and Rebecca Shoal by an iron pile lighthouse. Vessels using this passage should pass to the west of Rebecca Shoal and keep at least 2 miles from the lighthouse.

Dry Tortugas consists of a small cluster of low, sandy islets, forming the extreme western limit of the Florida Keys. The Tortugas Keys are nearly level and generally barren of vegetation, except Bush Key, which is distinguished by a scanty growth of brush. Fort Jefferson, an extensive brick fortification, is situated upon Garden Key.

There are numerous excellent anchorages among the keys, and, as his neighborhood is constantly frequented by fishermen who supply ıe Havana market, pilots may be readily obtained.

If temporary shelter is required it may be found to the southward of ggerhead Key in about 10 fathoms of water, with good holding ound well protected from northerly and easterly winds.

Loggerhead Key, the westernmost and the largest of the group, is dered by low bushes and is marked by Dry Tortugas lighthouse

From both the northern and southern ends of the key shallow sand-spits extend out having one or two spots nearly or quite bare at low water. It is $\frac{5}{8}$ mile in length, NE. and SW., and has a width of about $\frac{1}{3}$ mile. It is mostly covered with a growth of scrub brush, shows a bright, sandy beach all around, and has long sandy points at each end. Shoals make off from this key for a distance of $2\frac{1}{4}$ miles to the northward and about 2 miles to the southward and westward. The SW. spit is marked by breakers, and about $\frac{1}{2}$ mile inside its point there is a spot, bare at low water, called Southwest Key. On its east side Loggerhead is bold-to, and 8 to 10 fathoms will be found within $\frac{1}{4}$ mile of the beach, but there are numerous outlying shoals. On its west side 4 fathoms may be carried to within $\frac{1}{2}$ mile of the beach.

Loggerhead Buoy.—A buoy painted red and marked "Loggerhead" in large white letters is placed off the SW. end of Loggerhead Key Reef.

Caution.—Vessels should not pass to the northward or eastward of this buoy, but may pass close to the southward and westward.

General Remarks on Passing or Approaching Tortugas.—In passing to the southward of the Tortugas the lighthouse on Loggerhead Key should not be approached nearer than $2\frac{1}{2}$ miles, and that on Garden Key no nearer than $3\frac{1}{2}$ miles, on account of shoals which make off to the southward. The south point of the spit making off from Garden Key is marked by a buoy painted red and marked "Tortugas" in white letters. It lies in 21 feet of water and should be left on the starboard hand by vessels passing to the westward or entering the harbor. Large ships in heavy weather should keep outside the 10-fathom curve.

In approaching the Tortugas in thick weather the soundings should be carefully noted. If coming from the northward, westward, or southward and westward, you will strike 10 fathoms in time to avoid danger; but if coming in any direction from the eastward (after passing the bank to the westward of the Florida Reefs), you will not strike 10 fathoms until close up to shoals surrounding the group. In coming from the southward you will strike 100 fathoms at a distance of 16 miles, and coming from the southward and westward, or westward, at about 20 miles. Coming from the northward and westward you will be inside the 100-fathom curve when 70 to 100 miles from the group. When at a distance of 15 miles from Dry Tortugas light and to the westward of the meridian passing through it you will be in 30 to 40 fathoms; but if to the eastward you will be in from 15 to 20 fathoms.

There is a large bank with from $6\frac{1}{2}$ to 9 fathoms lying about 7 mi to the westward of Loggerhead Key, and separated from it by a ch nel 2 miles wide, with 16 to 19 fathoms. This bank would be dangero to large ships in heavy weather.

In approaching the Dry Tortugas from any direction the first obj to be seen will be the lighthouse, which will seem to rise from the wat Next you will raise Fort Jefferson, on Garden Key, which may be s

from 10 to 12 miles. Loggerhead Key, when seen, will show low and partly covered with bushes. The other keys, if seen at all, will not show very conspicuously.

Florida Straits—General Directions.—The reefs are lighted throughout so that a vessel can not approach nearer than 5 miles at night without sighting a light, and in the daytime the vicinity of danger is indicated in ample time by the change in the color of the water.

It must be borne in mind while in the vicinity of these reefs that the Gulf Stream, influenced by the wind, frequently sets strongly onto the reefs, especially in the space between the Alligator and Carysfort Reef lighthouses. For this reason vessels when beating up the straits should not stand close inshore in the nighttime, especially in thick weather.

Under the usual circumstances of wind and weather—that is, with a NE. wind and the Gulf Stream running 2 or 3 knots—the navigation of the straits by steamers and sailing vessels is entirely different. They will therefore be considered separately.

Steamers bound south, running between the northern ports of the United States and the Gulf of Mexico on their outward passage, generally steer a course to pass Cape Canaveral at a distance of from 12 to 15 miles; in thick weather or in the night sounding frequently and taking care not to shoal the water to less than 11 fathoms. From abreast of Canaveral light a course S. 13° E. (S. 15° E. mag.) may be steered, keeping in not less than 12 nor more than 16 fathoms, till Jupiter Inlet light is seen from the deck, when the ship may be hauled in toward it till a depth of 5 or 6 fathoms of water is reached, ¾ mile or one mile offshore. This distance offshore may be preserved safely in the daytime from Jupiter Inlet to Hillsboro Inlet, but as the shore curves outward here, care must be taken in the nighttime not to come too close, and a depth of 10 fathoms had better be kept, which will carry the vessel about 2 miles offshore. From Hillsboro Inlet to the northern end of the reef a south (S. 2° E. mag.) course may be steered.

Fowey Rock light is a very valuable aid to navigation. All dangers between it and the north end of Virginia Key will be avoided by taking care not to bring the light to bear to the eastward of south (S. 2° E. mag.).

In coasting along the reef in the daytime the beacons may be passed at a distance of 500 to 800 yards, but in the night a vessel should haul offshore as soon as Fowey Rocks light is made, and until abreast of it, whence she can run on courses parallel to the reefs at a distance of one 1½ miles, constantly checking her positions by bearings of the lights they are made and passed.

Vessels bound to Havana generally shape a course for that place on abreast of Alligator Reef light, but those bound to Key West or Gulf of Mexico continue their course between the Gulf Stream and reef.

Capt. Timmerman, a very skillful and experienced navigator, says: My experience has been that from Fowey Rocks to Carysfort Reef the

Gulf Stream runs parallel to and seldom more than ¾ mile from the general line of the reefs; but with fresh easterly breezes, which are the prevalent winds, the current runs close to the reef, the color of the water almost invariably marking its edge. To the westward and southward of Carysfort Reef, the line of no current gradually widens until abreast of Alligator Reef, where it is about 2 miles wide, or even wider, with northerly winds. From abreast of beacon 'E' on Conch Reef, there is frequently with northerly winds a strong westerly current between the Gulf Stream and the reef." The courses and general directions here given must, of course, be somewhat modified according to circumstances of wind and weather.

Steamers bound to the northward will find it advantageous to pass the lights on the Florida Reefs and coast at such a distance that they can be just seen from the deck. This course will give them the full strength of the favoring currents and will enable them to frequently verify their position, a point which can not be too urgently insisted upon.

Sailing vessels bound from ports in Europe, or from the Atlantic ports of the United States or Canada, to the Gulf of Mexico, and intending to pass to the westward of the Great Bahama Bank, shape a course for the southern end of Abaco Island, generally known as the "Hole in the Wall." Hauling to the westward between the south end of Abaco and the north side of the Great Bahama Bank, those vessels drawing not more than 12 feet may safely cross the bank, leaving its westward edge at a point about 15 miles south of Orange Cay. Vessels drawing more than 12 feet keep on to the westward through the NW. Providence channel between the Great and Little Bahama Banks, haul round the Great Isaacs lighthouse at a distance of 3 or 4 miles and follow down the western edge of the bank to a point about 15 miles south of Orange Cay. The wind is generally from the eastward, so that the water is smooth, but vessels becalmed are sometimes carried helplessly by the Gulf Stream to the northward of the Little Bahama Bank and have to make the best of their way to the Hole in the Wall again.

From the edge of the bank 15 miles south of Orange Cay a course should be steered to pass close along the northern edge of the Cay Sal Bank, and having passed Elbow Cay Light haul over for the Pan of Matanzas and coast along the Cuba shore at a distance of 3 or 4 miles till westward of the Tortugas, when a course may be shaped for the port of destination.

Vessels bound to Key West would, of course, haul to the northwa sooner, being governed by the strength and direction of the wind choosing a point to cross the Gulf Stream.

Sailing vessels bound north with a fair wind would, of course, follc the track used by steamers, skirting the circles of illumination of t lights along the reefs. As, however, the wind generally blows fro

between NE. and east, it is almost always necessary to beat for a portion of the way at least, and it is while by the wind on the starboard tack that most of the wrecks take place. While beating up through the stream, if a vessel can not get hold of some landmark along the reefs during the afternoon, she should not approach the Florida shore after dark in thick weather, but, remembering that current frequently sets strongly over the reefs, the vessel should be kept under short sail on the offshore tack during the night. By complying with this simple precaution the much-dreaded navigation of the Florida Strait will be deprived of all its dangers, which were formerly considered so great that vessels were instructed to keep entirely away from the Florida side of the channel.

During the past four and a half years it has been found that the axis of the stream (the point of the maximum flow) is on the west side of the Straits of Florida, and that the velocity of the current on the east side along the great Bahama Banks, Bemini Island and Gun Cay is always less than on the west side. Vessels navigating these waters can save time on their passages south by following down on the east side of the stream from Matanilla Shoal to Bemini or Gun Cay, and then crossing to Fowey Rocks (instead of crossing the stream from Matanilla Shoal to Jupiter Inlet), and then continuing the course on the west side of the straits.

CHAPTER IV.

THE BAHAMA ISLANDS AND BANKS.

The Bahamas.—Until 1783 the Bahamas frequently changed masters, but since that time they have remained British possessions. Until 1848 they were under one government, but Turks Island and the Caicos are now attached to Jamaica. The larger islands are inhabited, the population being 44,000.

This remarkable group is composed of numerous irregularly shaped white sandstone islets and rocks, thinly wooded, the loftiest about 400 feet high, most of them under 100 feet, and many only a few feet above the surface of the sea. They are generally situated on the edges of coral and sand banks, some of which are of the most dangerous character. They are remarkable for being steep-to, as the lead from 10 fathoms or less will frequently drop into 100 fathoms.

One or two of the largest islets are clothed with wood of moderate dimensions, of sufficient size for the scantling of vessels of from 150 to 200 tons burden. Brazilletto, yellowwood, lignum-vitæ, and fustic are exported in small quantities. The soil in general is of so light and stony a character that the vegetation is scanty, and it is only capable of producing fruit, Indian corn, and vegetables. Cotton was at one time a valuable article of commerce, but it is not now cultivated to any large extent. Lately cocoanut trees have been planted extensively. Sugar cane grows luxuriantly on many of the islands and is being more largely cultivated.

The most important product is salt, which is raked in great abundance at many of the islands. Fruit and a coarse description of sponge are also largely exported. Good water is rather scarce, and on some of the islands the inhabitants depend chiefly on rain water. Poultry is readily obtained at most of the inhabited islets, but cattle are scarce, although generally obtainable at Nassau; the breed of sheep is excellent.

A most remarkable feature is the exceeding clearness of the water, which enables the bottom to be seen from aloft at considerable depths and at some distance; the navigation of the banks is consequently conducted almost entirely by the eye, but care must be taken not to run with the sun ahead of the vessel.

Winds.—The Bahama Islands are all within the influence of the trade winds; their lowness, of course, exempts them from the regu-

land wind, but in the summer season a light breeze frequently comes from the Florida shore in the night and reaches the western side of the Little Bahama Bank, but no farther. At this period the wind generally prevails to the southward of east, and the more so as their NW. extreme is approached; the weather is then very variable, and squalls rush down with great violence, accompanied with heavy rains and an oppressive atmosphere. They are within the zone of hurricanes, and a year seldom passes without their being visited by a heavy gale at least from the SE., which inflicts serious damage both on shore and at sea.

Northers.—In the winter months, from about November to the middle of March, the trade wind is frequently interrupted by NW. and north winds. In December and January this may be expected almost weekly. Previously to this change the wind will draw round to the south and SW. About twenty-four hours after or less, dark masses of clouds will be seen rising from the westward, and in a short time the wind will rush suddenly from that quarter with the force of a double or treble reefed topsail breeze. It will soon veer round to NW. and north with clear weather, and remain between these points for two or three days. It will then haul gradually to NE., perhaps with increased force, accompanied by heavy squalls, and wear itself out at east in the course of a few days.

The barometer is scarcely any guide; a small fall may be detected as the wind draws to the south, and it will rise rapidly with the north wind. The mariner may be sure of the action of the wind, and that it will not back at this period, and this will enable him to seek shelter, if necessary, with every confidence in the change that will follow. On the southern edge of the group this change may be more sudden on account of the partial interference of the winds from the highlands of Haiti and Cuba on the regular trade, but it seldom takes place without a previous indication of dark masses of clouds to the westward.

Current.—A feeble stream, seldom exceeding half a knot, generally sets to the westward on the south side of the Bahama Islands and to the NW. on the NE. side; but it is liable to change, and often suddenly, especially in the NW. Providence Channel and on the NE. side of the Little Bahama Bank. Here it will sometimes be found running strong to windward. Some observations tend to show that this is more frequently the case after Northers, or on the increase of the moon. The opinions of the wreckers and Caiman fishermen appear to agree on these points, but there is no certainty in the matter and, consequently, more than ordinary attention is required when navigating among the sands. Near the northern and eastern bank of the Little Bahama the current sets strongly towards the bank.

Tides.—The tidal stream runs directly on and off all the banks at a rate of from one to 2 knots, except in the narrow channels between cays on the Great and Little Banks; here its velocity is greatly increased and in some places it is scarcely possible to contend against it.

Bank Blink is a phenomenon described as a bright reflected light hanging over the clear white sand banks and serving to point them out for a long distance. From lengthened experience, however, the navigator is most strongly warned not to trust to so fallacious a guide. It will be far better for him to depend upon the eye from aloft, the lead, the reckoning, and especially the latitude, which should be unremittingly checked.

Pilotage.—The law of pilotage as enforced at Inagua is nearly similar to the Nassau pilotage, the following are exceptions: Such vessels as may enter any harbor or anchorage at Inagua for the purpose of waiting a night's run or fair weather and not requiring or receiving the service of a pilot are not liable to pilot dues; vessels arriving to procure seamen are liable for half pilotage dues; and fees are charged according to registered tonnage of a vessel.

The Inagua pilotage act extends also to Long Cay, Long Island, Rum Cay, Ragged Island, and Exuma.

Abaco, Andros, Grand Bahama, Bemini, Berry Islands, Eleuthera, and San Salvador do not come under the jurisdiction of any pilotage act. There are no licensed pilots thereat, the act of accepting the services of a pilot must be voluntary on the part of a master of any vessel.

Tonnage and Light Dues.—Vessels employed on Government service, vessels employed under mail contracts with the Bahama Government, vessels exclusively engaged in turtling, sponging, or fishing. Vessels in pleasuring only and steamers are excused from paying dues.

Vessels wholly loading or discharging, 24 cents for every ton of the proper measurement of such vessel.

Vessels partially loading or discharging, 2 cents for each and every ton of the proper tonnage of the vessel, and 24 cents per ton measurement or weight of the goods shipped or landed.

Vessels in ballast or cargo for other port, 2 cents for each and every ton of the proper measurement of the vessel.

The Little Bahama Bank is of irregular shape and lies to the northward of the Great Bahama Bank, from which it is separated by the NW. Providence Channel.

Great Abaco Island is the largest of the numerous islands which skirt the Little Bahama Bank on all sides but the NW. and west; it rises on the eastern side of the bank and is inhabited. The SE. extreme is 2 miles in breadth and 90 feet high; at the eastern end of this headland there is a small, narrow tongue of low, flat rock, which projects about 300 yards to the southward, and close off it a very sm rock. This remarkable point is called the Hole in the Wall, from t sea having worn a large arch through the rock, which is visible abo 3 miles off, from SSW. to WSW., and the opposite bearings. A narr spit runs out southeastward from the point with depths of from 9 15 fathoms on it.

Anchorage in 10 fathoms will be found on the west side off the SW. point of Abaco, ¾ mile from the shore, with the lighthouse bearing N. 72° E. (N. 71° E. mag.).

Light.—On the SE. point of Hole in the Wall from a conical tower, a white light revolving every minute is shown at an elevation of 160 feet, and should be visible 20 miles between S. 47° W. (S. 46° W. mag.) and S. 65° E. (S. 66° E. mag.) through west and north. Reported irregular.

Cheroki Sound.—From the Hole in the Wall the eastern shore of the island rises gradually to a height of 120 feet, and the sandy beach which borders it is steep-to. Thence the coast bends in, forming a deep bight, called Cheroki Sound, which is everywhere foul, except at the NE. corner, where, with local knowledge, there is shelter for small coasters.

From Cheroki Point to Little Harbor Point the coast again trends to the northward. This part of the coast may be recognized by Ocean Point, a bold cliffy point 30 feet high at the north end of Winding Bay; there is no other part of the coast like it.

Light.—A fixed red light, shown from a small wooden tower, erected on Duck Cay. The light is visible from a distance of 6 miles between the bearings S. 48° W. (S. 47° W. mag.) and S. 87° E. (S. 88° E. mag.) over an arc of 225°, except where obscured to the eastward by the high land of Cheroki Point.

Caution.—There are several rocky ledges, on which the sea breaks heavily off this part of the coast, which are not yet thoroughly examined.

From Little Harbor Point to the northward the Abaco Islands are skirted, at a distance of from 2 to 6 miles, by a line of numerous cays, between which are narrow channels leading into the large sheet of water navigable by small craft within them.

Little Harbor.—Three hundred yards north of Little Harbor Point a small channel having a depth of 13 feet leads into Little Harbor, but it is difficult to make out, even with local knowledge.

Lynard Cay is the first of the islets north of Little Harbor Point; the reef extends ½ mile off shore, and there are 10 or 12 fathoms of water the same distance farther out. About 400 yards from the north end, between it and Channel Rock, there is another small cut, North Bar Channel, which carries a depth of 15 feet and leads into Pelican Harbor, but all these places are too difficult for a stranger to enter without a pilot.

Tides.—It is high water, full and change, in Pelican Harbor, at 8h. m. Springs rise 4 feet.

NOTE.—On the bar the tides run NW. and SE., 2½ knots at springs.

Light.—A fixed red light, shown at south side of entrance to Little arbor from a small wooden tower. The light is visible from a dis-nce of 6 miles between the bearings S. 33° E. (S 34° E mag.) and 12° E. (N 11° E. mag.) over an arc of 255°.

Pelican and Tilloo Cays, next northward, are skirted by a reef; soundings extend 3 miles seaward from Pelican Cays.

Elbow Cay is separated from Tilloo Cay by a narrow channel; at its north end is a high sandy bluff, and about a mile to the southward of the bluff there is a small settlement. This islet is at the NE. extreme of the Little Bahama Bank; the reef abreast the settlement is ¾ mile off; at the northern end the reef extends one mile off and then turns to the northwestward; it is one of the most dangerous and fatal elbows in the Bahamas.

Light.—On Elbow Cay, ¾ mile inland, from a circular stone tower is shown a fixed white light, at an elevation of 123 feet, and should be visible 15 miles.

Caution.—In thick weather, vessels bound to the SW. and falling to the westward of their reckoning are liable to be wrecked on Elbow Cay. It is therefore advisable for a vessel to strike the parallel of 26° 30′ N. well to the eastward of the cay. Should the wind be to the southward when in this neighborhood and the light not in sight, or the reckoning doubtful, it will be prudent to keep the vessel's head to the eastward in the night, as the lead will not give sufficient warning of the danger. The current generally sets to the NW., but sometimes in opposite direction, and the tides run through the openings at the rate of from 2 to 3 knots.

From Elbow Cay the range of small islets takes a NW. by W. direction for more than 100 miles, and skirts the shore of Abaco at a distance of from 3 to 6 miles.

The Elbow Reef sweeps round these islets at the distance of about 3 miles, and joins the NW. end of Man-of-War Cay, leaving an opening, Man-of-War Channel, from ½ to ¼ mile wide with a depth of 14 feet between it and the reef, which commences again to leeward. The channel lies close to the eastward of some small rocks nearly ½ mile N. 23° W. (N. 24° W. mag.) of the cay, as there is a small rocky head to be avoided lying about 400 yards NW. of the end of the cay.

A snug harbor for coasters drawing under 12 feet, is about 6 miles S. 45° W. (S. 44° W. mag.) of the opening. In a case of absolute danger a vessel of the above draft may save herself by running in here, but, without local knowledge, it would be attended with very great risk.

Tides.—It is high water, full and change, at Man of-War Cay at 8h. 0m., and the rise 4½ feet.

Cotland and Great Guana Cays, separated by a narrow boat channel, extend 9 miles from Man-of-War Channel, fringed on their seawa sides by a broken reef to a distance of ¾ mile.

The northern end of Great Guana Cay terminates in a bold bluff feet high, which is conspicuous from the eastward; from it foul groun extends N. 67° W. (N. 68° W. mag.) 2¼ miles.

Chub Rocks.—At 3½ miles N. 61° W. (N. 62° W. mag.) from the bluff a small patch of rocks 4 feet high, which may be passed on any side at

distance of 600 yards. These rocks are a good guide to the Whale Cay Channel, 2 miles to the SW. of them.

Whale Cay Channel.—Vessels intending to visit the settlement on Green Turtle Cay, the principal village on the Little Bahama Bank, must use the Whale Cay Channel, through which a depth of 14 feet may be carried. It lies between Whale Cay and the rocks to the NW. of it. The deepest water on the bar is 600 yards from the end of Whale Cay, between the point and a sunken rock, which generally breaks, and lies S. 58° E. (S 59° E. mag.) ½ mile from Channel Rock. From this position the highest part of the Chub Rocks bears N. 63° E. (N. 62° E. mag.)

Supplies.—At Green Turtle Cay wood and water may be obtained; provisions are scarce..

Tides.—It is high water, full and change, at Green Turtle Cay at 8h. 0m. Springs rise 4½ feet.

Walker Cay, about 65 miles northwestward of Green Turtle Cay, is the westernmost of the Grand Cays, and is woody and 55 feet high. The islets between are skirted, to the distance of from 1½ to 4 miles, by a reef, which presents no safe opening whatever.

Inner Channel.—Between the cays and Abaco there is a passage for vessels of 12 feet draft. Entering at Whale Cay channel it is from 200 to 400 yards from the shore of Great Abaco Island, passing north of Little Sale Cay and the Double Breasted Bars, southward of the triangle rocks, into the open water on the western portion of the bank.

NOTE.—In navigating these banks a stranger is very likely to be deceived by what is known locally as "Fish muds," having all the appearance of shallow banks of considerable extent.

Matanilla Reefs.—From Walker Cay the Matanilla Reefs, on which the sea breaks in moderate weather, run in a W. by N. direction about 25 miles, and being steep-to are extremely dangerous. The west end of the reefs terminates on the meridian of about 78° 50′ W., in lat. 27° 23′ N., and from this point the edge of the bank trends W. by N. 15 miles to its NW. end. At 7½ miles westward of the reef there is a coral knoll 2 miles long north and south, called Middle Shoal. At its north end there are 4½ fathoms water a mile within the edge of the bank, and on the south side only 2 fathoms. The ground between it and the reef is also foul.

Matanilla Shoal, a dangerous coral patch, lies 4 miles westward of Middle Shoal, 2 miles within the northern edge of the bank and 3½ miles from the NW. extreme, and at 5 miles S. 69° W. (S. 68° W. mag.) of it e bank will be struck in 13 fathoms. The patch is not ½ mile in ex- nt, and on one small spot there are only 12 feet. All this part of the nk is extremely dangerous. The bottom being rocky and covered h dark weed, the water is not discolored, and the shoals do not break; rock is so flat that no dependence can be placed on anchors.

ides.—The tidal streams run on and off the Little Bahama Bank, near the edge are at times strong. The current in the offing is very ertain for some distance to the northward.

West side of Little Bahama Bank.—From the NW. extreme, the bank takes a SSW. direction about 15 miles, when it reaches its outer western limit in lat. 27° 10′ N. and long. 79° 13′ W. Thence the edge of the bank sweeps round to the south and SSE. 30 miles to the west end of Bahama Island.

The whole of this part is closely skirted by narrow shallow sand ridges and detached coral patches, and is extremely dangerous. The Gulf Stream strikes the edge of the bank sideways, with a strength of from 2 to 3 knots, and the lead gives scarcely any warning. There are small openings here and there with 3 and 4 fathoms water in them, and in a case of absolute danger a vessel might be guided by the eye into safety on the bank, but it would be a mere matter of chance if she escaped shipwreck.

Memory Rock is a little, dark, barren, rugged islet, only 14 feet high, lying N. 23° W. (N. 24° W. mag.) of the west end of Bahama Island, about midway between it and the western limit of the bank, and ¾ mile within its edge. At 3 miles NW. of it there is a most dangerous small coral patch, on which the sea generally breaks. Between the rock and patch there are from 3 to 4 fathoms water, about a mile within the edge of soundings, under the lee of a sand ridge, on which there are 2 fathoms. To the southward of the rock there is no safe opening for vessels drawing over 12 feet. The edge of the stream comes generally close home to the rock. Between it and Bahama Island vessels are only influenced by the tides, which set regularly on and off the bank at the rate of from a half to a knot an hour.

Tides.—At Memory Rock it is high water, full and change, at 7h. 50m., but at Walker Cay it is not high water before 8h. 50m. Springs rise about 3 feet.

Sandy Cay is very small and covered with bushes to the height of 14 feet above the sea. A narrow sand spit runs off from it to the WNW. for nearly 3 miles, and a dangerous coral ledge, showing at low water, lies WSW. of it on the edge of the bank.

Wood Cay, about 3½ miles south of Sandy Cay, is a rocky islet, woody, ½ mile long and 26 feet high.

Indian Cay lies close off the NW. point of Bahama Island; between them is a channel, for small craft drawing 6 feet, round to the settlements on the north side of the latter island.

Bahama Island is inhabited, thickly wooded, but generally level, and about 40 or 50 feet high. At Settlement Point, the west end, it is a mile broad, north and south, and anchorage will be found under it i or 9 fathoms water, about ½ mile off shore, with the NW. point beari N. 56° E. (N. 55° E. mag.) and the SW. point S. 28° E. (S. 29° E. ma but a vessel must quit the moment the wind threatens to change.

Soundings appear to extend off a short distance, and anchor is marked on the chart under SW. Point; this part of the island is v little known. Thence the coast line takes an ENE. direction, a

toward the east end of the island sweeps round to the southward, forming a deep and dangerous bight, with southerly winds. This part appears to have a foul shore the whole way, without any anchorage. From the SE. extreme of the island the edge of the Little Bahama Bank trends to the south and round to the SE., and connects itself to the west side of Abaco at Rocky Point. It is closely skirted by numerous small islets and dangerous ledges, without any navigable openings between them, as far as Gorda Cay, which lies N. 56° W. (N. 57° W. mag.) of Rocky Point.

There is a well on Gorda Cay and anchorage under the west side. There is also water to be found abreast the anchorage under SW. Point of Bahama Island.

Soundings extend 1¾ miles south of Gorda Cay, but this part as far as Rocky Point has not been thoroughly examined.

Cross Harbor.—From Rocky Point the coast of Great Abaco Island trends to the SE., forming a large bight between it and Cedar Point, 8 miles distant; this bight is shallow and full of rocky ledges almost to the edge of soundings.

Great Bahama Bank.—Great Isaac, at the NW. extreme of the Great Bahama Bank, is a barren, narrow, honeycombed rock, about ¾ mile long and about 40 feet high, and being foul, yet very steep-to, landing is sometimes difficult even in moderate weather. There are 4½ fathoms water between it and the NE. rock, and the same depth between it and the Brothers; but, as before recommended, it will be better to pass outside of all. The ground to the SW. of the Great Isaac is foul for ½ mile.

Light.—On Great Isaac Island, from an iron tower, a white light, revolving every ½ minute, is shown at an elevation of 158 feet, and should be visible 16 miles. Eclipses not total within 6 miles.

Dangerous Shoals.—The shoal has but 10½ feet of water over it and lies with Great Isaac lighthouse bearing N. 44° E. (N. 42° E. mag.) distant 9½ miles, and the south Cay of Hen and Chickens bearing N. 49° E. (N. 47° E. mag.), distant 6 miles.

Information has been received that the steamer Tangier, drawing 17 feet 10 inches of water, touched lightly on and passed over a coral patch, approximately 9 miles S. 44° W. (S. 42° W. mag.) from Great Isaac lighthouse, or about ½ mile NE. of the shoal described above. Immediately after touching the lead gave 4, 4½, and then 5 fathoms.

The Hen and Chickens form a group of barren, rocky islets. A ssel may round their north end at ¼ mile, and anchor on the bank in athoms; but the ground to the SW. is foul to the distance of ¾ mile, ıere the depth is 2½ fathoms. In passing this neighborhood in the ght, do not come within the depth of 10 fathoms.

From the Hen and Chickens to the Moselle Bank the edge of the ık is clear, and vessels can run just within the edge in from 6 to 16 thoms.

Moselle Bank is dangerous in the nighttime, having only 4 feet of water on its south end, but in the daytime it is very conspicuously marked by a long black buoy with staff and basket-work ball upon it.

To avoid this shoal the Great Isaac lighthouse should not be brought to bear to the northward of N. 42° E. (N. 40° E. mag.) till the shoal is passed, or at night till the Gun Cay light is opened west of the Bemini Islands bearing S. 5° E. (S. 7° E. mag.).

The North and South Bemini are two irregularly shaped, sandy islands, covered with small wood to the height of about 40 feet, and occupy a space of nearly 6 miles north and south. They are separated by a very narrow cut, which opens out to the eastward and forms a secure harbor for wreckers drawing 8 feet. There is a small settlement, customhouse, and a resident magistrate; and vessels in distress may obtain water and supplies sufficient for the moment.

Anchorage will be found in 8 or 9 fathoms water, fine sand, about midway between the extremes of the islands, and a mile off shore; be careful, however, not to shoot too far in, and look out for a clear spot. A little more than a mile northward of the north end of the islands there is a remarkable small black rock, 8 feet high, called North Rock.

Henry Bank is stated to lie about N. 22° W. (N. 24° W. mag.) ½ mile from the south point of South Bemini Island, and ¼ mile from the shore. It is believed to have a depth of 3 feet upon it. This part of the bank should be approached with caution, as the depths are irregular.

Spar Beacon.—There is a spar beacon, surmounted by a barrel, on the north extremity of Picket Rock, to serve as a guide to Barnett Harbor. Vessels drawing less than 14 feet may find shelter against southwesterly winds on the Great Bahama Bank by entering the channel midway between the rock awash, north of the beacon and Triangle Rocks. The course is east (N. 88° E. mag.) until clear sandy bottom is struck in 3 fathoms; there anchor with Gun Cay lighthouse bearing S. 8° E. (S. 10° E. mag.).

Gun Cay is a mile long, and very narrow. Between it and South Bemini is a range of small rocks, from 10 to 18 feet high, within ¾ mile of the edge of the bank.

Light.—Near the south point of the cay from a conical tower a light, revolving red every 1½ minutes, is shown at an elevation of 80 feet, and should be visible 12 miles, except between S. 17° W. (S. 15° W. mag.) and S. 6° E. (S. 8° E. mag.).

Anchorage.—When 5 miles to the northward of the light, it should not be brought to the southward of S. 45° E. (S. 47° E. mag.) in order to avoid the low rocks between it and the Bemini Islands, which sweep slightly outward, and, being so close to the edge of soundings, the lead will be of little use. There is temporary anchorage, with easterly winds, in 7 or 8 fathoms water, about ¾ mile off shore, with the lighthouse bearing east (N. 88° E. mag.). Wreckers find good shelter within the cay by passing round the south end.

Cat Cays are two narrow woody islets, 40 feet high, lying from one to 2 miles within the edge of the bank, and extending about 4 miles S. 34° E. (S. 36° E. mag.) off Gun Cay, from which they are only separated by the small channel mentioned above. Around the south point of the southern cay there is good anchorage for vessels drawing under 12 feet, called Dollar Harbor, where they will lie sheltered from all points but the south. The point is bold and steep-to, and the only danger to be avoided is the Rabbit Rock, which is nearly awash, and lies N. 66° W. (N. 68° W. mag.), a mile from the point. The lighthouse, open west (S. 88° W. mag.) of Round Rocks, clears the Rabbit. There are some small barren rocks about 14 feet high at ¾ mile to the SW. of the point, and they must beleft to the southward in going in. The small rocks, Factory Cays, 12 feet high, extend nearly 2¼ miles to the SE.

Some wells of good water will be found on the east side of North Cat Cay, about ¼ mile from its southern end.

The flood runs ENE.; the ebb, WNW.; springs rise 3½ feet.

Browns Cay is a barren rock, 13 feet high, lying S. 30° W. (S. 28° W. mag.), 12 miles from Gun Cay lighthouse, and 1½ miles nearly north of it there is a small sandy cay of the same height. Off the south end of Browns Cay is a small black rock, and between it and the cay there is a 9-foot channel to the bank.

Beak Cay, 1½ miles farther southward, is partially clothed with stunted bushes about 13 feet high. Thence to Riding Rock, 7 miles distant, the space is filled with small rocks and coral ledges, and quite impassable.

Riding Rock is 14 feet high and scantily covered with brushwood. At 1½ miles southward of it is South Riding Rock, 13 feet high, which has on it a small rough beacon of stones. At ¼ mile eastward of South Riding Rock is a small square islet 12 feet high, called Castle Rock, SE. of which is an anchorage for small vessels.

Orange Cay, about 17 miles from Riding Rocks is the southernmost islet on this side of the Great Bahama Bank. The ground between it and Riding Rocks is foul and almost choked up with a line of small rocky heads. In some places there are 3 and 4 fathoms water between them, but except in a case of necessity it would not be prudent to pass through. Orange Cay is a barren rock, about 13 feet high, lying about 2 miles within the edge of soundings. A ridge of low rocks runs off 1½ miles to the northward of it; and at the same distance southward there a single small black rock, from which a coral ledge, with only 12 feet ater on it, extends off 2 miles in the same direction. There is tem- orary anchorage westward of the cay in about 6 fathoms water.

The SW. side of Great Bahama Bank trends southward from range Cays, and for 20 miles, to the parallel of 24° 35′, there are ry few shallow patches, although there are depths of 3 and 4 fathoms, miles within the edges. Thence the bank inclines gradually to the ntward of south, and is foul until latitude 23° 30′ N. is reached.

Cay Sal Bank is somewhat in the shape of a pear, and is skirted by islets, on all side but the south. Between it and the coast of Florida to the NW. lies the Florida Channel on the eastern side lies the Santaren Channel, and south of it is the Nicholas Channel. To the SE. these two last channels unite to form the Old Bahama Channel.

Double-headed Shot Cays are on the northwestern edge of the bank. They are from 20 to 40 feet high. There are several channels between them and the anchorage; inside is a fair one in NW. winds.

Water Cay is the easternmost and largest of them. Near the center, on the south side, there is a natural well of excellent water, and opposite to it on the same side of the island is a good landing place.

Caution.—When approaching the Water Cay keep outside of a S. 5° W. (S. 2° W. mag.) bearing of the lighthouse, or one mile outside the cay.

Marion Rock.—This rocky ledge, having a least depth of 6 feet upon the eastern extreme (from which the west extreme of Water Cay bears S. 14° W. (S. 11° W. mag.), distant ½ mile), extends about 500 yards in a WSW. and ENE. direction, and has a general depth of from 3 to 7 fathoms with three rocky heads upon it, over which there are 6, 7, and 8 feet respectively.

Light.—On the highest of the Double-headed Shot Cays, named North Elbow, at the west edge of the bank, stands a conical lighthouse, from which is exhibited a fixed white light 96 feet above the sea, visible 15 miles except when it bears approximately S. 66° W. (S. 63° W. mag.), being then intercepted by Water Cay when 9 miles distant.

Rompidas Ledge.—From Double-headed Shot Cays the SW. side of the bank trends to the southward and eastward for 12 miles to Cay Sal the only islet on this part of the bank. From the southernmost of Double-headed Shot Cays foul ground extends off 1½ miles to the SSW. The Rompidas, 4½ miles from the NW. end of Cay Sal, is a rocky ledge awash, 1¼ miles in extent NW. and SE., close to the edge of soundings. The opening on either side of the ledge is quite free of danger, but in running on or off the bank it will be better to pass to the northward of it.

Cay Sal, so named from its possessing a valuable salt pond, is in the shape of a triangle. The NE. side is formed by a narrow ridge of sand hills; the other parts are very low and sandy and partially clothed with brushwood. During the season for raking the salt it is inhabited. There is temporary anchorage close under the west side, in about 7 fathoms, on the edge of soundings, but it is not good. The tides set aroun it with great strength, and are sometimes influenced by the Florid Stream running to the SE.

The Lavanderas is a small rocky ledge awash. Between this an the Anguila Islets there does not appear to be any danger along th southern limits of the bank; this part, however, has not been satis factorily examined, and there is reason to believe many rocky head

may be found near the edge. The center of the bank is foul in many places and had better be avoided.

In beating across the bank a vessel should keep within 7 or 8 miles of the northern edge of the bank.

Anguila, the largest of the islets on Cay Sal Bank, is partially wooded and from 40 to 50 feet high. It is cut through in several places, but there is no opening fit even for a boat; it may, therefore, be described as one island. It lies at the SE. extreme of the bank, and its NE. side is close to the edge of soundings.

Good Anchorage will be found in 6 or 7 fathoms water, off the SW. side. There are some wells of good water on it, but very difficult to find.

Between Anguila and the Dog Rocks to the NW. are several clusters of small, low rocks, with deep water between, but most of the openings are dangerous.

Dog Rocks.—The northeasternmost islet on Cay Sal Bank are barren and rocky. They are separated near the center by a narrow but deep navigable cut, and the eastern edge of soundings is about 2 miles outside them. Vessels crossing over from the Great Bahama Bank in the night by proper attention to the lead will escape danger; and it may be observed that accidents frequently happen here by neglecting this safeguard. The opening between these islets and the nearest rocks to the SE. is 7 miles wide, and although the soundings are irregular and the bottom dark and alarming, it appears to be quite clear and is frequently used by vessels crossing inside the cays.

Muertos or Deadmen Cays lie about 3 miles within the edge of the bank, but great care must be taken in the night, as they are steep-to, and the soundings do not indicate the distance from them, and they are likewise not in sight of the Elbow Cay light. Several of the rocks are a considerable distance apart, but it would not be prudent to cross the ledges between them.

Tides.—The direction and height of the tides are much influenced by the wind, but generally the flood tides run from all sides on to the bank and the ebb off. At the Double-headed Shot Cays the tides have a gyratory course from north through east to south.

Directions.—It has been the almost universal custom for vessels proceeding westward from the Great Bahama Bank to endeavor to strike soundings on the NE. end of Cay Sal Bank or to make Elbow Cay light.

With light winds or in thick weather this course is still preferable, t with reasonably clear weather and a good breeze the distance will much shortened by crossing over at once to the Florida shore, mak- Alligator Reef light, and by bearings of this light with the ones on mbrero and Sand Keys running along inside the Gulf Stream.

f the Cay Sal Bank route be taken and the wind be scant from the stward vessels may run in on the bank on either side of the Dog ks and pass off to the southward of the Elbow; or should the wind

be light and tending to calm they may anchor within, to avoid being set to the northward, otherwise it will be better to run down outside, especially in the night, paying great attention to the lead.

Having passed Elbow Cay light, the course should be S. 48° W. (S. 45° W. mag.) until close over to the Cuba shore, to avoid the strength of the current. This course should lead direct toward the Pan of Matanzas, and within about 12 miles NW. of the light on Cay Piedras, but this will depend upon the set of the current, which is very uncertain and sometimes strong, into the Nicholas Channel.

If bound to the SW. ports of the United States it will be advisable to run along the Cuba shore as far westward as Mariel, and then shape a NW. course, so as to pass at a proper distance westward of the Tortugas. Should the Cuba shore be left in the daytime, an occasional bearing of the high land will enable the mariner to estimate the strength of the stream and to regulate his course accordingly. He may depend upon finding the current right across, and probably with increased strength, as he advances to the northward.

NW. end of Great Bahama Bank.—From abreast Great Isaac Island the edge of the bank gradually rounds that island at a distance of about 6 miles and then extends for about 30 miles SE. by. E. to abreast the Gingerbread Ground. The edge of the bank then takes a more easterly direction with a slight bend to the southward for 35 miles to the Stirrup Cays, and in this space it is quite free of danger and the lead will be a safe guide.

The Gingerbread Ground is about the most extensive and most fatal danger on the Great Bahama Bank, the current setting strongly over it. The foul ground, full of rocky heads, lies close to the edge of deep soundings, on dark bottom, not easily seen from a distance, and may be said to extend from the Great Isaac a distance of 30 miles, and it is from 2 to 5 miles in breadth. There are several small low rocks on it, and several cuts through, which are clearly pointed out in the chart, but strangers had better not attempt them, unless forced to do so, and then they must entirely depend upon the eye.

Northeast or Gull Rock is small and 12 feet high. It lies just NE. of Great Isaac. Rocks with 12 feet of water over them have been reported 1½ miles northward of Northeast Rock in line with the east end of Great Isaac.

The Brothers are two very similar small black rocks 7 and 6 feet high. They lie about 4½ and 5 miles eastward of Great Isaac.

The Little Isaacs are three in number. The easternmost, call East Isaac, is 11 feet high, and lies 14 miles eastward of Great Isaa 18 miles from the east end of the Gingerbread, and about 3 from t edge of the bank; at 1½ miles to the eastward of it there is a sm rock awash at high water. Middle Isaac is only ½ mile westward the east rock, and 12 feet high, and Little Isaac, 2 miles farther in t same direction, is 8 feet high, and 3½ miles within the edge of t bank.

The Berry Islands are a group of small, narrow, wooded cays, from 50 to 60 feet high, which, from Great Stirrup Cay, sweep round to the eastward, forming nearly a semicircle and a good guide in the night. There are but few inhabitants, and supplies are scarce. The western side is quite blocked up by shallow sand banks, but to the eastward the islets are skirted by a flat bank of soundings having from 10 to 14 fathoms water, extending off from 5 to 8 miles, and is a good guide at night.

Great Stirrup Cay, the northernmost of the Berry Islands, is a necessary landmark for vessels intending to cross the bank from the NW. Providence Channel to the westward. At about ½ mile from the west end there is a small sandy cove and some wells of good water, and landing is generally easy, except with northerly winds. In moderate weather, with the prevailing easterly winds, a vessel may anchor in 7 fathoms, sandy bottom, with a flagstaff on the hill S. 8° E. (S. 9° E. mag.), about ¾ mile off shore. A small supply of stock and vegetables may be obtained.

Light.—From Great Stirrup Cay a fixed white light is shown at an elevation of 81 feet, visible 15 miles, between N. 54° W. (N. 55° W. mag.) and N. 45° E. (N. 44° E. mag.) over an arc of 261°.

Great Harbor.—Great Stirrup Cay is separated from Great Harbor Cay by an opening 800 yards wide, and within it there is a limited anchorage, Great Harbor, with a depth of 3½ fathoms. It is completely exposed to the NE., and, except in a handy fore-and-after, a vessel might meet with considerable detention. Those under 10 feet draft can get close up under Great Harbor Cay, or lie more snugly in Panton Cove at the SE. end of Great Stirrup Cay. Goat Cay, which is about ½ mile within the opening, forms a remarkable steep, rounded, woody hill 80 feet high.

Directions.—Should a vessel be forced to run for the anchorage in Great Harbor, bring the south end of Goat Cay to bear S. 48° W. (S. 47° W. mag.) and just clear of the north end of Great Harbor Cay, which is bold and steep to at the distance of 200 yards. This mark will lead just clear of the east end of the bar which extends out from Stirrup Cay; give the north end of the Great Harbor Cay a berth of rather more than 200 yards and anchor with it bearing east (N. 89° E. mag.) in 3 fathoms of water; or shoot the vessel farther in to the SE. of the point, according to her draft.

Slaughter Harbor is a small basin between Great and Little Stirrup ys, scarcely 400 yards in diameter, but has a depth of 15 to 18 feet. e channel, however, is barred, and only navigable at high water, with assistance of a pilot, for vessels drawing 12 feet. It is quite open the northward, but the bar, which generally breaks across in this ıd, protects the anchorage.

ittle Stirrup Cay is about a mile in length, 55 feet high, and ɔp-to; there are 5 fathoms on the north side close to the rocks. A

shallow sand spit runs off a little more than a mile from the west end, with a channel between for small craft, leading around to Slaughter Harbor.

Tides.—It is high water, full and change, at Great Stirrup Cay, at 7h. 0m.; the rise at springs is 4 feet, and the tidal streams run directly in and out of all the above openings with great rapidity. Between Great Stirrup Cay and Great Isaac lighthouse the flood tide sets directly onto the bank, while the ebb tide sets off the bank.

Great Harbor Cay, about 60 feet high, is nearly connected to Haines Cay, and is the largest of the Berry Islands, and has a few settlers. Its eastern shore forms several sandy bays, separated by low white stone cliffs. Near the center, at about ¾ mile off shore, there is a small islet called Petit Cay, with a boat channel within it. Shallow, rocky ground extends from the NW. end of this islet to within about 1½ miles of the north end of Great Harbor Cay, and a wide berth should be given to it. The soundings are so regular that in the night time they scarcely give warning of approach, and great care must be taken not to come within the depth of 10 fathoms.

Lignum-Vitæ, Cistern, Bamboo, and Anderson Cays lie on the west side of Great Harbor Cay, and are only separated by small boat channels. On Cistern and Anderson Cays there are remarkable clumps of dark trees 100 feet above the sea. Between Cistern and Bamboo there is a small snug inlet, called Bullock Harbor, for coasters drawing 8 feet. The channel is through Great Harbor, between Goat and Lignum-Vitæ Cays, or from the westward round Little Stirrup Cay.

Haines Cay is about 3 miles long, and its north end terminates in a white sandy bluff. To the northward of the bluff there is a small rocky islet called the Hawks Nest, under which there is good boat shelter.

Market Fish, Holmes, and Little Harbor Cays occupy a space of about 8 miles in a SSE. direction, and are only separated by small shallow cuts; in the center of Holmes Cay are some conspicuous white cliffs. The shore eastward of these cays is foul for nearly a mile. Between Haines Cay and Market Fish Cay there is an opening 3 miles wide, and an anchorage in it for small craft.

Bonds Cay is 3½ miles long, and the cut between it and Frozen Cay to the northward is about ½ mile wide, but foul and impassable. The latter cay, the easternmost of the group, is only a mile long, and round its north end a vessel will carry 15 feet of water into an anchorage on the west side, in 3 fathoms water, open, however, to the NE.

Whale Cay lies at the SE. extreme of the group, and forms elbow to the NE. and north 4½ miles long; at the north end there i single house. The flat bank of soundings commences at the turn of elbow. Between Whale and Bonds Cays the opening is about 1½ m wide, and near the center of it are two remarkably small rocks, cal the Sisters, which are connected to the latter cay by a ledge nearly d forming a breakwater to a snug anchorage for small craft. The ch

nel lies to the southward of the Sisters, and the eye will guide the vessel through in from 10 to 15 feet. Whale Point forms the southwestern extremity of the cay. About a mile eastward of Whale Point there are some remarkable white sand cliffs 80 feet high.

Frazers Hog Cay lies close to the westward of the point, and under it there is a good shelter, with northerly winds, in 3 fathoms, and vessels of light draft can get close in under Thompson Cay.

Frazers Hog Cay is locally known as South Whale Cay and sometimes as Bird Island, and Thompson Cay as Frazers Hog.

From Frazers Hog Cay the cays sweep around to the westward, and at 6½ miles distant is South Stirrup Cay, which is covered with trees, growing out of a swamp to a height of 35 feet. Next in order there is a small low islet called Rum Cay, and at 1½ miles further on is Blackwood Bush.

Northwest Channel.—At the NW. end of the Tongue of the Ocean is a narrow intricate channel between sand ridges, through which may be carried a depth of 10 feet at low water onto the bank, and it is usually used by the wreckers. These small vessels leaving Nassau generally anchor under the Chub Cays for the night, and contrive to be at the entrance of the channel by sunrise in order to be able to see the numerous heads which skirt the edge of the bank for about 1½ miles inward before they come to the sand-bores. The clearest route will be found by striking soundings with Blackwood Bush, bearing N. 76° E. (N. 75° E. mag.) 5 miles.

Mackie Bank.—A checkered black and white buoy with staff and two checkered balls, in 2 fathoms at low water, lies on the SE. edge of the bank, in lat. 25° 28′ N., long. 78° 45′ W. This buoy is intended to guide vessels in crossing the Bahama Bank, and to correct their positions in running from Stirrup Cay to Orange Cay; it is visible 5 or 6 miles.

Directions for crossing Great Bahama Bank.—The greater number of vessels proceeding from ports of the United States and of northern Europe bound to Matanzas, Havana and the SW. ports of the United States in the Gulf of Mexico run through the NW. Providence Channel. Those drawing under 12 feet may cross the bank between Berry Islands and the western cays, but those of heavier draft must pass outside all. Being 5 or 6 miles south of the Abaco lighthouse, the course will be about N. 84° W. (N. 85° W. mag.) 40 miles to the edge of soundings off Great Stirrup Cay.

Having brought the lighthouse on Stirrup Cay to bear S. 67° E. (S. 69° E. mag.) distant about 4 miles, steer S. 57° W. (S. 56° W. mag.), and from the edge of soundings run 33 miles to the commencement of the flats of middle ground, which extends right across the bank, and is about 15 miles in breadth. Thence a S. 35° W. (S. 34° W. mag.) course would lead 5 or 6 miles eastward and in sight of Orange Cay and to the edge of the bank about 13 or 14 miles southward of it. A vessel may

verify her position by sighting the buoy on the south edge of Mackie Bank.

In crossing the flats the eye must guide the vessel between the numerous clear white sand ridges and small black heads, which are easily seen even in the night time if the weather is clear. Some attention, however, should be paid to the tide on the first course. Should the vessel enter upon the bank with the first of the flood and a commanding breeze, she had better steer half a point farther to the westward, and the contrary on the ebb, judging at the same tide according to the depth, which should gradually decrease up to the sand ridges. (H. O. Chart, No. 26*a*, shows various tracks across the bank.)

The course from the edge of the bank about 14 miles south of Orange Cay to the edge of Cay Sal Bank northward of Dog Rocks is S. 47° W. (S. 45° W. mag.) 50 miles.

Tides.—It is high water, full and change, on the bank, at 8h. 0m., and the stream runs from one to half a knot an hour to within a short distance of the north side of the Middle Ground. On the flats there is very little set, and on the south side of the Middle Ground the stream goes regularly round the compass from east to south and west, from high to low water and the contrary. On the parallel of 25° N., about 16 miles eastward of Orange Cay, it is not high water, full and change, before 10h. 15m., and the rise is 3 feet, so that a vessel will carry two hours more of high water across the shallowest part of the bank; therefore by entering upon the S. 35° W. (S. 34° W. mag.) course at three-quarters flood a steamer of 12 feet draft may cross the flats before the tide begins to fall.

Caution—Elbow Bank.—Although the water is so shoal and clear, the lead should be well attended and the line marked to feet (when wet), as the vessel may be set by the tide too far to the windward on the Long Banks, or on the Elbow Bank, to leeward, which will be indicated by the gradual decrease of depth as she approaches either way should the wind be scant. If she gets to the eastward of the track, toward what is called the Long Bank, the little heads of sponge and dark fans will become more numerous. In the winter months, should the wind haul to the southward, a sure indication of a northwester, instead of beating about among the shoals, it will be better to anchor and await the change that will soon follow.

Outer Passage.—Vessels drawing over 12 feet, as noticed above, must pass through the NW. Providence Channel and close along the weste edge of the Great Bahama Bank, and in the winter months, more pa ticularly, the navigation requires the utmost care and attention. The is generally but little current in the channel, except after northe winds, when it frequently sets eastward about a knot an hour. Hav ing rounded the Abaco light, as before directed, a N. 78° W. (N. 79° mag.) course for 90 miles should lead to a position nearly N. 70° E.

68° E. mag.), about 18 miles from, and, if the weather is clear, in sight of Great Isaac lighthouse, and 6 or 7 miles from the edge of the bank.

If it be found that the Isaac lighthouse will be made during daylight, the course may be altered to west (S. 88° W. mag.) for that purpose, after running about 80 miles, but not before, in order to keep well clear of the Gingerbread Ground, and the greatest caution and attention to soundings should be observed on approaching this most dangerous neighborhood. Having rounded Great Isaac, shape a course along the cays, taking care in the night not to come within the depth of 10 fathoms, or to bring the light to the northward of N. 42° E. (N. 40° E. mag.) until Moselle Bank is passed, or, from aloft, Gun Cay light is opened westward of Bemini Islands.

After passing North Bemini, the cays must be closely hugged, in order to avoid the Florida Stream, which, as stated before, comes close home to the rocks with its full strength. A short calm, within a mile of the edge of this part of the bank, might drift a vessel so far to the northward as to oblige her to run out around the Little Bahama Bank, and to enter again from the eastward. Therefore, instead of attempting to beat along with a light wind, it will be more prudent to anchor under North Bemini and await a slant to get round the Elbow.

Should a vessel be caught here in the winter, with the usual warning of a northwester, it will be better to run back into the NW. Providence channel, and be guided by bearings of Great Isaac until the wind draws round to the northward, which it is sure to do generally in the course of twenty-four or forty-eight hours. She may also run in between the openings to the northward of Moselle Bank, and anchor on the bank in 4½ fathoms, 2 or 3 miles within the Hen and Chickens; but she will be exposed to a short, chopping sea, and might find some difficulty in weighing, and run the risk of losing her anchor.

It is advisable for sailing vessels not to attempt to cross over to Cay Sal Bank until having reached Orange Cays, as before indicated. In the summer months, when light SE. winds prevail, a strong NW. current frequently runs into the Florida Stream from Santaren Channel, and vessels meeting with a calm or light airs at this period are frequently drifted through the strait, even in sight of the Bahama Cays.

The NW. Providence Channel is seldom navigated from west to east, except by vessels of war bound to Nassau. In this case, after sighting the Elbow lighthouse on Cay Sal Bank, which should always be done if possible, endeavor to make Gun Cay light well to the southward, closing in to the cays as quickly as possible, getting on the edge of soundings at the Bemini Islands, and haul sharp round Great Isaac. Be extremely cautious, however, to avoid Moselle Bank. A vessel will generally have to beat up from Great Isaac, and, as already stated, too much caution can not be observed in standing toward the Gingerbread round. Should the wind hang to the southward of east, it will be

equally necessary to guard against getting embayed in the bight between Gorda Cay and the south point of Great Bahama Island, for with SE. winds there is frequently here a strong indraft, and no safe anchorage.

Tongue of the Ocean.—This most remarkable inlet, or estuary of ocean water, is about 100 miles in length, north and south, with a bight to the eastward which comes within about 20 miles of the Exuma Cays. This latter part is about 30 miles wide, but the northern portion, between the west end of New Providence and Green Cay, is only about 15 to 20 miles across to Andros Island.

Andros Island, about the largest of the Bahama Islands, forms the western side of the Tongue of the Ocean. It is low, swampy, thickly wooded, and intersected by numerous shallow creeks, which almost cut the island into three parts at high water. Along the eastern side, however, from High Cay to the southward, there is a narrow ridge of hills from 70 to 90 feet high. This shore is skirted by numerous small cays and reefs to the distance of from one to 2 miles, and, being steep-to, is very dangerous, particularly in the neighborhood of High Cay, where the tongue is only 15 miles across. The western shore of the island is composed of slimy mud, like pipe clay, and is so low that in NW. gales it is overflowed to a considerable distance inland. The water is here so shallow that in some places a boat can not come within many miles of the shore.

There is no harbor whatever, but boats and small craft drawing 4 or 5 feet find their way through the reefs on the eastern side of the island into some of the creeks, for the purpose of collecting sponge, which is found in large quantities, and shipping the wood, which is floated into them from the lagoons in the interior. There are but few inhabitants, and the only settlement of consequence is at Red Bay, near the NW. end of the island. From this end an extensive flat of sand, dry in many places at low water, runs off 12 miles to the NW., and on it are several small islets, the northernmost of which are called Joulters Cays. About 2 miles to the northward of Morgans Bluff, a remarkable rocky headland forming the NE. point of the island, there is an opening in the reef, abreast of some small rocks called Golding Cays, and it will admit a vessel of 9 feet draft into shelter within, in moderate weather.

Tides.—It is high water, full and change, on the east side of Andros at 8h. 0m.; on the west side, off the north end, at 10h. 30m., and off the south end at 1h. 15m. The tidal streams meet in the center of the bights, where the rise and fall is only from 12 to 18 inches, and the flood runs to the eastward through the great bight, three hours after high water.

South Cay is a small barren cay 18 feet high, and is the southernmost of the chain of rocks and cays lining the SW. side of the Tongue of the Ocean.

Washerwomans Cut is about 5 miles NNW. of South Cay. The chart is the best guide to the channel, which crosses the bank to the SW. None of these channels should ever be attempted with the sun ahead.

The entrance to the cut is to the northward of the Dolly Cays and Sisters Cut, and south of Pigeon Cays. Through it, 13 feet may be carried across the bank.

Hurricane Hole.—This entrance also leads into Hurricane Hole, a snug anchorage for vessels of small draft to the NW. of Pigeon Cays.

Southside Channels.—On the south side of the Tongue of the Ocean there are several small channels leading across the bank to the SE. and southward, available for vessels of light draft.

They are called Queens, Blossom, Thunder, and Lark Channels. Through Thunder and Blossom Channels vessels of 14 feet draft may pass.

The navigation depends entirely upon the eye, but is not difficult.

Coming to the southward, however, the channels are not so easily discovered. The tides run rapidly through and sometimes across these ridges, so that the navigation is unsafe in the night. A vessel may, however, anchor anywhere between them. From the entrance to Queens Channel the edge trends to the NW. and is clear for about 8 miles, but from this point it is full of rocky heads and reefs all along the western side of the Tongue of the Ocean.

Green Cay is 60 feet high near its center. To the southward of it and just on the edge of the bank, which is here very steep-to, anchorage may be found. It requires very great care not to shoot too far in.

About 6½ miles SE. of the cay there are some small barren black rocks about 20 feet high, called Booby Rocks. Thence the edge of the bank sweeps round to the eastward, and then to the southward, and being impassable, has received only a partial examination.

From Green Cay the edge of the bank takes a NW. by N. direction for 28 miles to SW. reef, and is very foul, there being several rocky heads nearly awash, and it is consequently dangerous to approach in the night.

Southwest Reef.—This very dangerous rocky ledge lies on the edge of soundings SE. from Clifton Bluff. It is nearly awash, and the ground is foul for a mile to the northward of it.

New Providence Island, being the seat of government, and possessing a safe harbor for a few vessels of 15 feet draft, is the most portant island of the Bahamas. A narrow ridge of wooded hills m 80 to 120 feet high skirts the northern shore almost the whole way. e north side of the island is skirted by several small cays covered h brushwood, and within less than ½ mile of the edge of the ndings. The southern part of the island is low and covered in at part with extensive pine barrens or woods. The shore is gener- y swampy and shallow; flat sands run off from it for some distance.

An excellent carriage road runs along the northern shore, and another crosses the island from the town to and over the Blue Hills.

Besides Nassau and Delaport Bay the anchorages are West Bay and Southwest Bay.

Hog Island is the easternmost of the cays which bound the north side of Nassau Harbor; the western end gradually falls from low sand hills to a flat rocky point on which is the lighthouse.

Silver Cay lies 1,200 yards westward of Hog Island, and ½ mile from the shore of New Providence. At about 400 yards further westward is Long Cay, and 1½ miles beyond this is North Cay. There is a navigable opening for small vessels between the two latter cays; and also an opening through the foul ground about a mile to the westward of North Cay leading into Delaport Bay, a small anchorage for vessels of light draft, but seldom used. The shore to the westward of these cays should not be approached nearer than a mile.

Lights.—On the west point of Hog Island from a conical tower a fixed white light is shown at an elevation of 68 feet, and should be visible 10 miles between N. 25° E. (N. 24° E. mag.), and N. 26° W. (N. 27° W. mag.), illuminating an arc of 309°. When the bar is dangerous or impassable, a red light is shown from the flagstaff to the eastward of the lighthouse. Obscured when bearing S. 80° E. (S. 81° E. mag.).

A light is shown from the cupola of the quarantine office on Athol Island, at an elevation of 50 feet, and should be visible 8 miles, between N. 23° W. (N. 24° W. mag.), and N. 68° W. (N. 69° W. mag.), through an arc of 45°.

Nassau stands on the northern slope of a ridge about 5½ miles from the east end of the island, and is one of the most picturesque and well-built towns in the West Indies. It is much frequented by visitors from the United States and Canada, and has an excellent hotel, which is the property of the government and is leased to an American; open from November until May.

The health of the place is good. Yellow fever has been epidemic, but not lately. The sickly season is from July 1 to October 15. There is a health officer and quarantine is maintained. There are two hospitals—the quarantine, which is situated on Athol Island; also a public hospital, called the New Providence Hospital. Sick mariners are admitted to this hospital at $1.12 per day. The capacity is about three hundred patients.

The authority to be called upon is the governor. The United States is represented by a consul and vice-consul.

Supplies.—Provisions can be obtained, but are high in price and scarce in quantity. Rain water can be had and some of poor quality from the wells in the city. Beef and mutton can be had, but the price is high.

Coal.—A moderate supply of both hard and soft coal can generally be obtained, but at a high price.

Marine Railway.—The marine railway on the south side of Hog Island, suitable for vessels of 400 tons, is at present out of repair.

Dues.—Twenty-four cents per ton inward and outward for vessels with cargo. Fruit and salt-laden vessels are exempt outward. Wharfage, $7.20 per 100 tons register. Light dues, 6 cents per ton register. Vessels arriving and departing in ballast pay 2 cents per register ton.

Pilots are found in numbers, and if services are offered pilotage is compulsory, and it is necessary to take them if going over the bar inside. Vessels under 30 tons are exempt. The pilotage fees are: 8 feet and under, $5; 10 feet and under, $7; 12 feet and under, $10; 14 feet and under, $13; 16 feet and under, $19; 17 feet and under, $24; 18 feet and under, $26; and $1.20 for every half foot above 18 feet; $10 additional is charged on steamers. Half pilotage is charged when vessels anchor outside the bar.

For Cochrane Anchorage and Southwest Anchorage, one-fourth in addition to the above rates.

Steamers.—The New York and Cuba Steamship Company leave New York every other Thursday, reaching Nassau the following Monday, with mails, passengers, etc. The Bahama Steamship Company have a monthly steamer to New York. A small steamer performs service between the different islands.

Telegraph.—A submarine cable connects Nassau with the land line at Jupiter Inlet.

Nassau Harbor.—The entrance to this harbor lies between Hog Island and Silver Cay; but between them a rocky bar runs right across, which breaks heavily with strong NW. and north winds, and is sometimes impassable for several days. The greatest depth at low water springs is 17 feet, but this is only in a space not 50 yards wide, and vessels drawing over 15 feet can not enter safely.

Direction.—When bound to Nassau from the north or NE., a wide berth should be given to the NE. elbow of the Little Bahama Bank until the parallel of 26° 30′ N. is reached. Approaching from the eastward the latitude of 25° 45′ N. should be most carefully maintained until either the north end of Eleuthera, which may be seen about 12 miles off, is sighted, or the Abaco lighthouse, which is visible in clear weather 16 miles away.

The current, as the Bahama Islands are approached from these points and also from the east and SE., generally runs to the NW., but not strong. To the northward of Eleuthera, however, a strong set in the posite direction will sometimes be found after NW. and north winds, d probably after fine weather on the increase of the moon, but it will safer not to depend upon this. Should the land of Eleuthera be ade, haul round Egg Island Reef at the distance of 3 or 4 miles, and hen Great Egg Island bears east (N. 89° E. mag.) the course will be bout S. 34° W (S. 33° W. mag.) and the distance nearly 32 miles to assau lighthouse.

The first objects seen when approaching Nassau Harbor will be Forts Fincastle and Charlotte, and soon after the government house, a large square building on the top of the ridge, between them. When near the entrance a stone obelisk will be observed on the hill a short distance to the eastward of Fort Charlotte, which is the westernmost fort; and when the lighthouse bears south (S. 1° E. mag.) distant about ½ mile, a small, low rock will be opened out close under the land, called Tony Rock, on which is a pole beacon with a triangular frame on the top.

Tony Beacon, open a little to the east of the obelisk, bearing S. 10° W. (S. 9° W. mag.), will lead over the deepest part of the bar, westward of a red buoy (not always in place) on the extremity of the spit off Hog Island; when the lighthouse bears N. 81° E. (N. 80° E. mag.) turn sharply to port till the western edge of Cathedral tower comes in line with western apex of roof of eastern barracks bearing S. 48° E. (S. 49° E. mag.), this will lead in clear of the sand heads.

Anchorage.—The best anchorage is abreast the ordnance wharf. Vessels drawing 13 or more feet should moor head and stern, with the heaviest anchor to the eastward. The anchors must be planted in mid-channel, with a sufficient scope of chain to swing clear of the upper flukes, and hove well taut.

The depth of water in the harbor is said to be decreasing; it is not advisable for a vessel drawing more than 15 feet to attempt to enter. The holding ground at the anchorage is not good.

Vessels merely wishing to communicate with Nassau, with the wind to the southward, will find a temporary anchorage off the north side of Hog Island, in about 14 fathoms, on the very edge of soundings. This anchorage must, however, be approached under easy sail, and care must be taken not to shoot too far in; in the winter months be prepared to quit the moment the wind threatens a change.

The best berth is with the government house bearing S. 21° W. (S. 20° W. mag.) just open to the eastward of Christ Church and Hog Island lighthouse S. 70° W. (S. 69° W. mag.).

The lighthouse must not be brought to the westward of this bearing on account of the shoals which run off the north side of Hog Island.

Abaco Anchorage.—Should a strong northwester overtake a vessel at the entrance of either of the Providence Channels, it will perhaps be better to remain under the lee of the south end of Abaco, or anchor under the west side of the Hole the Wall, and wait until the wind moderates and the sea goes down. It may still continue to blow hard as the wind draws round to the NE., but when it reaches this quarter the sea generally subsides on the bar in a short time. A good sheltered berth will be found under Abaco in 11 fathoms water, with the lighthouse N. 75° E. (N. 74° E. mag.), about ¾ mile from shore.

Tides.—It is high water, full and change, in Nassau Harbor, at 7h. 30m.; springs rise 4 feet, neaps 3 feet. The floods set to the eastward

and the ebb to the westward, about a knot an hour, and at times with greater strength.

Eastern Channel.—Vessels drawing under 11 feet may enter Nassau Harbor from Douglas Road or Cochrane Anchorage, but this is only to be done by the eye. A depth of 9 feet may be carried at low water over the eastern flats of Fort Montague, and the channel lies close under the south sides of Athol and Hog Islands.

Boat Landings.—There are two principal landings: the eastern or government landing near the center of the town, at the foot of the public grounds; the other is about ¼ mile to the westward, at the foot of the street leading down to the governor's house. At high water, boats can land anywhere along the sea-wall.

Bar Signals.—If the harbor is approached with a northerly wind, and there is an uncertainty as to the state of the bar, should it be dangerous to cross, a red flag will be hoisted on the signal staff near the lighthouse, and at night a red light exhibited. In this case it will be more prudent to proceed to the Douglas Channel, or to the anchorage at the SW. end of the island. Should it be passable, but too dangerous for a boat to get out, a white flag will be hoisted, and the pilot boat will be seen waiting just within the breakers, showing a flag with red and white horizontal stripes. In this case, cross the bar, steer for the boat, and receive the pilot. This, however, is a dangerous experiment for a vessel of heavy draft, and, except in a case of great emergency, it will be far more prudent to act as above stated. No attempt should be made to cross the bar when dangerous.

NW. Coast.—From Nassau the shore trends westerly for 4½ miles, then WSW. 4¼ miles, and thence with a slight southerly curve to the SW. for 3¼ miles to Lyford Cay, which forms the northern part of West Bay. The whole of this coast is fronted by cays and reefs, and the edge of the bank is about a mile off shore.

West Bay.—The west end of the island forms a small bay which affords good shelter from all points but the west, to small craft drawing 7 feet water. Directly off the middle of the entrance, nearly a mile from either point, is Goulding Cay, a narrow, low, rocky islet about 600 yards in length east and west, and steep-to on the south side; but a reef, which generally breaks, extends off ¼ mile to the NW. from its west end, and there are deep soundings about 400 yards beyond it.

Southwest Bay.—The SW. end of New Providence is formed of remarkable bold white perpendicular cliffs about 30 feet high. The best
horage will be found with Clifton Bluff N. 37° W. (N. 38° W. mag.), and
south extreme of the island S. 82° E. (S. 83° E. mag.), in 4½ fathoms
er, just on the edge of soundings, and about ½ mile off shore. A vessel
/ go farther in, according to her draft, and be guided by the lead.
uld she have to work up, be very careful to avoid a small rocky patch
! feet, lying close to the edge of the bank with the bluff bearing N. 25°

W. (N. 26° W. mag.) nearly 2 miles, and the Conch Rock S. 79° E. (S. 80° E. mag.). The latter, however, is only about 8 feet high, and so small that it will scarcely be visible from the deck of a small vessel. A vessel may also anchor southward of this patch in 5½ fathoms, with the bluff N. 25° W. (N. 26° W. mag.) and the above rock east (N. 89° E. mag.).

The Bank.—From New Providence Island the bank runs to the northeastward about 35 miles to Eleuthera, and has on its edge a number of small islands and rocky reefs, separated by narrow channels, the principal of which are the Douglas and Fleeming Channels.

Among these small islands are several anchorages, which may be picked up from the chart.

Salt Cay Anchorage.—Salt Cay is a little more than 2 miles long, but very narrow. Under its western point is a snug anchorage for two or three vessels of 14 or 15 feet draft.

There is a rocky ledge with 13 feet of water on it, reaching off ¼ mile from the west end of Salt Cay, where the sea only breaks with strong NW. winds. The western and southern edges of the ledge are marked by two black spar buoys, but they can not be depended upon; this channel requires a leading wind. Nassau lighthouse on with the center of Pork Fish Rock leads up to the anchorage; the tide runs across the fairway very strongly.

Vessels leaving Salt Cay Anchorage after strong east or NE. winds will probably meet with rollers on the bar, which will cause her to pitch heavily, even after the wind has subsided for two or three days.

Tides.—It is high water, full and change, in Hanover Sound, at 8h. 15m.; springs rise 4 feet, neaps 3 feet.

Hanover Sound, between Salt Cay and Athol Island, is a good berth for two or three vessels drawing under 18 feet. As the entrance is only 200 yards wide and open to the NE., it is difficult for a sailing vessel to get out, and in the winter season she may be detained for a long time.

In approaching this anchorage from the NE. care must be taken to avoid the range of low islets and coral patches which skirt the north side of Rose Island to the distance of 1½ miles, and outside of which soundings extend for ¾ mile.

The leading mark into the harbor is a remarkable conical bush on New Providence Island, near the creek village, just open east of the quarantine officer's house on Athol Island.

Steer in on this line till the east point of Salt Cay bears N. 20° W. (N. 21° W. mag.) when haul up S. 20° E. (S. 21° E. mag.) and anchor in 3 fathoms of water with the west end of Rose Island Rocks bearing N. 4 ° E. (N. 44° E. mag.)

A pilot should be taken, if one can be obtained.

Green Cay Anchorage.—To the SW. of Green Cay there is a sm f anchorage for small vessels, well sheltered, except to the westwa . Anchor in 3 fathoms of water with the west point of Green Cay bearin f

N. 23° W. (N. 24° W. mag.) and the south point of Sandy Cay bearing west (S. 89° W. mag.).

This anchorage is unsafe with NW. winds.

Douglas Channel is distinguished by two pole beacons on small black rocks in the center of the opening. It is navigable for vessels of 20 feet draft, but it is so narrow and crooked, and the tide so rapid, that a pilot is absolutely necessary. However, in the event of a vessel being forced to run in without assistance, the following directions may be useful.

Directions.—Wait for the flood tide, and strike the edge of soundings with the beacons in one S. 53° E. (S. 54° E. mag.) which line will lead close to the westward of Booby Island Ledge, and when the small pile of stones on the west end of that island bears N. 85° E. (N. 84° E. mag.) haul up about S. 73° E. (S. 74° E. mag.) so as to pass to the windward of the black buoy on the NE. edge of the shoal ground of the Douglas Rocks. It is seldom, however, that the wind will allow a vessel to do this, but the tide is so strong under the lee, that by proper attention she may shoot through the narrows, which are only about 300 yards wide. Should she be forced to make a board, it had better be done under the west side of the Douglas Rocks, where they are steep-to. If under 14 feet draft, she may shoot into the southward of the beacons; but there is a very dangerous small rock, with 4 fathoms around it, right in the middle of the opening between the Douglas and South Channel Rocks, which, on account of the strong ripplings over the dark bar that runs across, is not seen.

If it be determined to take the latter channel a boat had better be placed over this rock, for the tide runs here so strong that without a good commanding breeze the vessel would be scarcely under control. Having passed the buoy off Douglas Channel a S. 39° E. (S. 40° E. mag.) course will lead between the Turtle Head and the black buoy off the north end of the Hook Sand, whence the course may be gradually shaped to S. 45° W. (S. 44° W. mag.) for Douglas Road or Cochrane Anchorage, guided by the eye and chart. The buoys are not to be depended upon.

Cochrane Anchorage.—A convenient berth will be found in about 4 fathoms water, sand and marl, with the blockhouse on Potter Cay nearly in one with Montague Fort on New Providence N. 79° W. (N. 80° W. mag.) and the house on Rose Island N. 6° W. (N. 7° W. mag.) about 8 miles from the town of Nassau. An anchorage may also be taken up a short distance within the Douglas Channel in Shoe Hole Road, in 4 or 4½ fathoms, but it is not good holding ground, and in a strong Norther vessels are liable to drag. The sea in these winds seldom breaks across, and they may, therefore, run in here when the bar at Nassau is impassable.

Tides.—It is high water, full and change, in Douglas Channel, at 8 h 30 m; springs rise 4 feet, neaps 2½ feet.

Water.—There are wells of excellent water near the house on Rose Island, but difficult and inconvenient to get at.

Fleeming or Six Shilling Channel.—The opening between the Six Shilling Cays and the Samphire Cays is 6 miles wide, but the channel is only about 1¼ miles in breadth, and lies about a mile southwestward of the former islets. It is capable of admitting vessels of 20 feet draft without much difficulty, provided they have some little knowledge of the locality.

Shannon Beacon.—On the southwesternmost of the Six Shilling Cays is the outer or Shannon Beacon, triangular shaped, 50 feet high, and visible 7 or 8 miles. The inner beacons on Quintus Rocks are two pole beacons, on the southern rocks; they bear N. 22° E. (N. 21° E. mag.) and S. 22° W. (S. 21° W. mag.) from each other.

Directions.—When approaching the Fleeming Channel from the northward run down close to the edge of the bank, which is about a mile from the cays, and enter upon soundings with the Shannon Beacon bearing S. 79° E. (S. 80° E. mag.) when the Quintus Beacon will be just open south of it, and then steer S. 48° E. (S. 49° E. mag.) This course should lead about a mile southwestward of the Shannon, and when it bears N. 6° W. (N. 7° W. mag.) bear up S. 25° W. (S. 24° W. mag.) which will lead into Douglas Road or New Anchorage.

As the tides run right across the inner part of the channel, the flood to the SE., the ebb to the NW., at the rate of 2 or 3 knots, steer accordingly, so as to pass 400 yards to the eastward of a black buoy with flag, moored S. 59° E. (S. 60° E. mag.) 2 miles from the upper or NE. Samphire Cay, and S. 34° W. (S. 33° W. mag.) 6¼ miles from the Quintus Poles; these latter, therefore, will be a good guide. The buoy lies in 2 fathoms water, at the inner and narrowest part of the channel, which is little more than a mile wide. A short distance to the NE. of the buoy there is a small ledge of 14 feet, called the Middle Ground, with 21 feet on either side, but it had better be left to the eastward.

In beating out when the buoy eastward of the Samphire Cay bears southward of S. 56° W. (S. 55° W. mag.) do not stand farther eastward than to bring the Quintus beacons in line, and to the westward keep the Pimlico Islands open eastward of the Six Shilling Cays. The edge of the shoal ground on either side of the channel, however, may be seen from aloft. A vessel may anchor in the channel, or take up a convenient berth for quitting about a mile to the SW. of the Quintus Rocks, but she will be exposed to the westward. The shoal ground extending southward from the Shannon Beacon should be carefully avoided.

Tides.—It is high water full and change in Fleeming Channel at 9 h 0 m.; springs rise 3½ feet, neaps 1½ feet.

The Pimlico Islands are a range of small, barren, low, rocky islet At about 2 miles within the Pimlico Islands is Current Island, which only separated from the west end of Eleuthera by a narrow channe called Current Cut, through which the tide rushes with the force of a rapid.

Egg Reef.—From Little Egg Island a chain of small islands extends to the ENE. for nearly 10 miles, bounded on the north by a dangerous reef to the distance of about 2 miles. The northern pitch of this reef lies N. 84° W. (N. 85° W. mag.) 4 miles from Bridge Point, and N. 37° E. (N. 36° E. mag.) 5¼ miles from the paps on Royal Island, which, from this direction, are seen nearly in one. From this pitch another narrow spit of bank, equally valuable as a guide in the night as the NE. bank, if proper attention be paid to the latitude and lead, runs off 3½ miles to the northward; it is about 2 miles broad, with a depth of from 7 to 12 fathoms on it.

The west end or elbow of the reef terminates N. 78° W. (N. 79° W. mag.) 2½ miles from the paps, and N. 39° W. (N. 40° W. mag.) nearly 2 miles from the hill on Egg Island. Along the NW. the depths are 9 and 10 fathoms at ¾ mile from the reef, but at the elbow the edge of soundings comes close home; this neighborhood is very dangerous, and requires the greatest attention. George, Charles, and Russell Islands, the easternmost of this chain, lie so close together, that from the northward they appear as one island 3½ miles in length east and west.

Rocks.—A short distance from this western elbow, and outside of the reef, lie two dangerous rocks, called Landrail and Lorton Rocks. Landrail Rock bears N. 12° W. (N. 13° W.) of the hill on Great Egg Island, and N. 59° W. (N. 60° W. mag.) of the western pap on Royal Island. Lorton Rock bears N. 14° E. (N. 13° E. mag.) of the hill on Egg Island, and N. 32° W. (N. 33° W. mag.) of the western hummock of Royal Island. There are numerous other rocks along the edge of this reef having a depth of 3½ to 4½ fathoms between them.

Southwest Reef lies close to the edge of soundings, and its north end bears about S. 34° E. (S. 35° E. mag.) 1½ mile from Little Egg Island; it is 2 miles long north and south, and although nearly dry it seldom breaks. About 1½ miles S. 11° E. (S 12° E mag.) of the south end of the reef is Current Rock, a low, black, rocky islet; and 2 miles southward of the latter is the north end of Pimlico Islands.

Little Egg Island, the westernmost of the chain, is a narrow rocky islet, less than ¼ mile long and only 15 feet high. The edge of the bank comes within ¾ mile to the westward of it.

Great Egg Island, is a wooded islet about a mile long, ¼ mile broad, and 67 feet high, with a conspicuous white house at its center. The opening between it and Royal Island is little more than 200 yards across, and the elbow at Egg Reef terminates near the middle of the islet.

Anchorage.—There is anchorage in 8 fathoms of water on the edge of the bank, with Great Egg Island hill in one, with Little Egg Island N. 23° E. (N. 22° E. mag.) about a mile from the latter, but the holding ground is not good, and a heavy swell generally rolls in round the elbow of Egg Reef. Vessels drawing under 16 feet may go so far in as

to bring Little Egg to bear N. 68° W. (N. 69° W. mag.) and the paps on Royal Island N. 6° E. (N. 5° E. mag.) where they will have 3 fathoms at low water. In beating up they may stand towards the cays by the lead, observing that the south end of Little Egg is foul to the distance of a long ½ mile. When standing to the southward be careful when approaching the SW. reef.

Tides.—It is high water, full and change, at Egg Islands, at 7h. 45m.; springs rise 3½ feet.

Light.—A fixed white light is exhibited from the summit of Great Egg Island and is visible over an arc of 338° between the bearings S. 46° W. (S. 45° W. mag.) and S. 68° W. (S. 67° W. mag.). Elsewhere the light will be obscured partially by the high lands of Royal Island and Northern Eleuthera.

The light, shown at an elevation of 72 feet above the sea, should be visible, in clear weather, from a distance of 10 miles.

As this light is erected principally for the use of coasting vessels, and is not a powerful light, it should be regarded only as a warning light for the dangerous reefs in the vicinity of Egg and Royal Islands.

Royal Island, the largest of the group, lies parallel to and within Egg Island Reef. Near the center of the island there is a conspicuous large stone house, and about ¾ mile to the SW. of it are two remarkable woody paps or hummocks, close together, and about 74 feet high. On the south side of the island there is a snug little harbor for small craft drawing less than 9 feet. In the middle of the entrance lie two small dry docks, and on entering it will be better to pass close to either of the points east or west of them. The best berth is with the house bearing N. 11° E. (N. 10° E. mag.) or N. 23° E. (N. 22° E. mag.) in 10 feet at low water. At about 1¼ miles south of the harbor there is a narrow rocky ledge, nearly dry, and in working up from the SW. it will be better to keep to the northward of it.

Water.—A well of good water will be found near the house on Royal Island.

George Island, the easternmost of the group of islands NW. of Eleuthera, is separated from it by a narrow channel leading round to Harbor Island. On the sandy point at the east end of the island there is a small village of fishing huts. Russell Island is woody and about 85 feet high.

Eleuthera Island is of a very irregular shape, and may be said to form the NE. elbow of the Great Bahama Bank. It is thickly inhabited, and the soil is peculiarly adapted to the cultivation of pineapples, which are largely exported. From Bridge Point, the northern point of the island, to the Glass Window, the coast line trends generally southeastward but bends in to the westward, forming deep coves and bays and is fronted by a range of small islets, which sweep around to the southward, and within which there is good shelter for small coasters drawing 8 or 9 feet.

Northeast Bank.—From Man Island, which forms the elbow of the above cays, a spit or tongue of bank about 2½ miles broad, with 12 and 14 fathoms of water on it, runs off 5 miles N. 45° E. (N. 44° E. mag.), and, with careful attention to the lead, it serves as a valuable safeguard in approaching this very dangerous neighborhood in the night; but the latitude is the great point to be attended to here, and, if not certain of this, a wide berth should be given to this locality, which is generally the landfall for vessels bound into the NE. Providence Channel.

West Harbor is entered through a small cut close off Bridge Point; but it requires the aid of a pilot.

Harbor Island is the southernmost of the above-mentioned islets. It is 3 miles long north and south, but scarcely ½ mile broad; the east side is composed of sand hills about 50 feet high, and on the west side is Dunmore Town, which is considered the healthiest spot in the Bahamas; the south end is about the same height, but rocky and woody, and is separated from the main by a narrow channel, through which vessels of 12 feet draft may enter into a small but well-sheltered anchorage named East Harbor.

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East Harbor has a bar at the entrance on which the sea breaks in heavy weather, but there is not less than 14 feet at low water. The opening is easily recognized by the sand hills to the northward and the ridge of bold rocky cliffs to the NW. of the Cow and Bull southward of it. Bring the opening to bear S. 35° W. (S. 34° W. mag.) and run boldly in, bordering towards Harbor Island, and anchor just within the bar in 3½ fathoms water. The tide runs through with great rapidity, and it is therefore necessary to moor. Vessels are prevented from going farther in by an extensive shallow sand flat, which separates this anchorage from that off the town, and, being exposed to the NE., this place is difficult to get out of, and consequently seldom visited. It would be found, however, a safe refuge for a vessel caught in the bight between it and James Point.

Vessels entering this harbor by the south bar should steer for the entrance on a course S. 35° W. (S. 34° W. mag.) and keep near the north side of the channel, as the shoal extends from the south shore nearly half way across. There is always a swell on the bar, even in light winds, and the tides run strong.

Anchorage can be found in 3¾ fathoms with Dunmore Point bearing N. 10° W. (N. 11° W. mag.) and the south entrance point N. 74° E. (N. 73° E. mag).

Mail by sailing vessels fortnightly to Nassau. No telegraph communication. Water may be had, but no other supplies.

East Coast.—Cow and Bull, are two very remarkable round-headed black rocks from 20 to 30 feet high, at the south end of a very low neck of land which nearly divides the island into two parts, and

just SW. of Glass Window, where the sea has pierced a large arch through the low, flat ridge of cliffs. The coast trends ESE. from them for 14 miles to James Point.

At James Point the reef runs off a mile to the NE., and a small spit of the bank 1½ miles beyond it. All this part of the island is low, with some sand hills from 30 to 50 feet high, and is scarcely a mile broad.

From James to Palmetto Point, a distance of 17 miles, the coast trends SE. by E. Close to the southward of Palmetto Point there is a small opening through the reef carrying a depth of 8 feet, leading into a little inlet called Savanna Sound, where there is also a settlement containing about 300 inhabitants. There is here a small but good salt pond, but the fresh water is not good, the well being used by cattle. To the NE. of Palmetto Point there are 10 fathoms water about 2¼ miles off, but thence the edge gradually approaches the shore to a distance of a mile.

From Palmetto Point the eastern shore trends southerly 31 miles to Eleuthera Point and is slightly indented. It is foul almost the whole way, and closely skirted by a reef with deep soundings about ½ to a mile outside it.

Miller Anchorage.—From Eleuthera Point the western shore trends NW. 16 miles to Bamboo Point, and the bank extends off about a mile. About 4 miles northward of Eleuthera Point, under Miller Hill, which is about 60 feet high, good anchorage will be found in 7 fathoms water, just within the edge of the bank, but be careful to look out for a clear spot, and leave on the approach of a westerly wind.

Rock Sound.—From Bamboo Point the western shore takes a NNW. direction for 3½ miles; it then turns abruptly to the SE. and round to the eastward, forming Rock Sound, where is situated one of the largest settlements, containing about 500 inhabitants. To the northwestward of Powell Point there are many shallows and sand ridges, on several of which low sand cays, called Schooner Cays, have formed, and between which are channels capable of admitting vessels drawing less than 10 feet; those, however, bound here for fruit or stock above this draft generally enter on the bank from the NW., through the Fleeming or Douglas Channels. At ½ mile S. 17° W. (S. 16° W. mag.) of Powell Point is a small islet called Chub Rock.

Tarpum Bay is the next settlement on the west side of Eleuthera. Small vessels may anchor here close to the shore, protected from the westward by numerous sand bores nearly awash at high water. There are 500 persons at this settlement, and there are good wells bored in the rock.

Governor Harbor is a small cove about 11 miles farther northward. In entering this cove keep close to the south point to avoid a small rock having only 12 feet of water over it, lying about 100 yards off, with 3 and 3¼ fathoms between it and the shore. The anchorage is exposed to westerly winds, but with good ground tackle and proper precaution

there is no danger. The best berth is in 3½ fathoms, with the north point of Cupid Cay bearing S. 48° W. (S. 47° W. mag.) and the south point of Leavy Island N. 56° W. (N. 57° W. mag.).

The cay on the south side of the harbor is known locally as Cupid Cay, the one on the north side as Leavy Island, and the bluff inside it as White Bluff.

Water.—There are some wells near the opposite shore about 1½ miles from the village, but the water is not very good. About 11 miles to the northwestward of this, near the beach, is what is called James Cistern, where after heavy rains abundance of good water may be obtained, but it is scarce in the dry season.

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Pitman Cove, generally called The Cove, is the northernmost settlement on Eleuthera. This part of the shore is bold and steep-to, and a vessel may anchor in 4½ or 5 fathoms within ½ a mile of it.

Directions.—Vessels bound to any of the above settlements from the westward will not have less than 21 feet water across northward of the Middle Ground, on a clear sandy bottom. The depth is 15 feet on the northern edge of the Middle Ground, at about 4 miles from Finley Cay, which is very low and sandy, and in beating up the lead must be the guide. The channel between the Middle Ground and the low rocks to the NW. is about 4 miles wide in the narrowest part, abreast the Samphire Cays, from whence it gradually opens out to the NE.

Tides.—It is high water, full and change, on the west side of Eleuthera, at 9h. 0m., and the rise and fall is from 2½ to 3 feet; but there is scarcely any tidal stream until within 5 or 6 miles of the openings.

Exuma Sound.—From the south end of Eleuthera Island the edge of soundings sweeps around to the northwestward and westward as far as the Ship Channel, then in a SE. direction for nearly 100 miles to Great Exuma Island, forming Exuma Sound.

There are several small intricate openings between the cays leading on to the bank.

Ship Channel is the northernmost and by far the best of all the openings, and lies N. 69° W. (N. 70° W. mag.) 38 miles from the south end of Eleuthera. At the south end of Ship Channel Cay, which bounds the south side of the channel and has a small beacon on it, there are some conspicuous sand cliffs, which with Highborn Cay are a good guide for the opening. The islets on the north side of the channel are very low barren rocks. As the opening is approached an inner range of small cays, the northernmost being a bold black rock, will be observed at some distance within the outer islets. A stone beacon 50 feet high stands on North Rock, which lies 100 yards southward of the Mushroom, the northern rock, and 30 feet above low water.

With sufficient local knowledge there will be no difficulty in running in to this opening by bringing the above beacon to bear N. 66° W. (N. 67° W. mag.), upon which line a vessel will carry 4 fathoms water over

the bar. This channel is generally used by vessels drawing not over 12 feet, bound to or from Nassau, in this direction. The ground outside and at the entrance is dark and deceptive, but the shallow part of the bar on the north side generally shows itself by strong tide ripplings.

Directions.—Vessels bound to Nassau having entered Ship Channel, and being about 800 yards north of Mushroom Rock, should steer S. 80° W. (S. 79° W. mag.) 8 miles, or until they have brought the sand cliffs of Ship Channel Cay to bear S. 61° E. (S. 62° E. mag.) as the run may be influenced by the tide. The course will then be N. 61° W. (N. 62° W. mag.), which ought to lead across the Middle Ground in 10 feet at low water, avoiding the small heads, which are easily seen.

Vessels drawing over 12 feet, and as much as 15, may cross the bank westward into Tongue of the Ocean, and proceed to Nassau round the west end of New Providence Island. In this case, having brought the sand cliffs of Ship Channel Cay to bear as above, steer S. 68° W. (S. 67° W. mag.) 18 miles, which course should take the vessel southward of the Yellow and White Banks, and in a depth of 2½ fathoms at low water; thence steer N. 89° W. (west mag.) 8 miles to the edge of the bank. Should the water not deepen as above, the tide will have set the vessel too far northward, and she must haul a little more to the southward until it does so. As many small patches will be met with in the way, by no means attempt to run in the dark, or when the sun or weather prevents the shoals from being distinctly seen. A vessel may anchor anywhere, provided she has 2 feet to spare at low water.

The small islets on the north side of Ship Channel terminate about 5 miles from the entrance; thence the edge of the Bahama Bank sweeps round to the eastward about 20 miles, and presents no opening whatever as far as Powell Point.

Tides.—It is high water, full, and change, in Ship Channel, in Highborn Cut, and in Wax Cay Cut, at 7h. 45m., and in Wide Opening, at 8h. 0m.; springs rise 4½ feet, neaps 2½. The tides run regularly in and out of all the above openings with great velocity, according to their breadth. In Ship Channel its rate is from 2 to 3 knots, gradually decreasing as the vessel advances upon the bank.

Allen Cays are on the north side of Highborn Cut. These cays are numerous, and on one of them, near the center of the group, are some cocoanut trees.

Highborn Cut, 10 miles northward of Wax Cay Cut, is a much better opening to run through, but extremely difficult to beat out of. It is easily recognized by Highborn Cay, which bounds the south side of the channel, being the highest of the whole range.

Wax Cay Cut has the same depth as Wide Opening, but is very narrow and intricate. The channel lies close to the rocks on the south side and in the narrowest part is only 200 yards wide. Wax Cay, on the north side of the cut is 93 feet high, while the cays to southward are only 50 and 60 feet, this serves to point out the cut. The bank here extends out ¾ mile from the islands.

Wide Opening, 10 miles southward of Wax Cay Cut, is more readily recognized by the great distance between the large cays, which are here 50 feet high and about 3 miles apart, forming a bight to the WNW.

Vessels drawing 10 feet with the aid of a pilot may use this channel, and run across to the Tongue of the Ocean, about 30 miles to the westward; or under the lee of the cays, and round the east end of New Providence into Nassau. From Cistern Cay, on the NW. side of this opening, the range takes N. 16° W. (N. 17° W. mag.) direction and becomes somewhat more elevated.

Conch Cut is difficult to recognize, from the similarity in appearance of the adjacent cays, which are from 30 to 50 feet high. It is only adapted to small, handy, fore-and-aft coasters.

Galliot Cut is 28 miles SE. of Conch Cut, but the opening is so difficult to recognize, so narrow and intricate, and the tides rush through it with such velocity that it is seldom used by the smallest craft.

Adderly Cay lies about 9 miles SE. of Galliot Cut and 25 miles to the NW. of the beacon on Stocking Island. A stone beacon, 30 feet high, stands on the cay. To the southward of this beacon there is a channel and harbor for small craft. There is a well of good water on the west end of Lee Stocking Island and a cultivated salt pond on Norman Pond Cay, westward of it.

Great Exuma Island is merely separated from Little Exuma by a small, shallow channel, almost fordable at low water.

The south shore is generally low and swampy, and skirted by sand banks and small cays, among which boats can only navigate at high water. The north shore is more firm and elevated, varying from 50 to 100 feet in height.

The island contains 2,300 inhabitants, but as there are no large salt ponds they are scattered about and employed in raising stock and provisions; it is, consequently, only visited by small coasters, who convey the produce to Nassau. The whole of the northern shore is skirted by a line of narrow, woody islets and small, barren rocks to the distance of from one to 1½ miles, and within them there are several secure harbors for vessels drawing as much as 14 or 15 feet. The channels, however, are so exceedingly narrow and intricate as to be quite impassable to strangers, and even with the assistance of a pilot there would be considerable risk in a vessel of this draft beating out. Those, however, drawing 12 feet will not have this difficulty, as they can run in at the east end and out at the west.

Stocking Island, the largest of the islets on the northern shore of Great Exuma is 3 miles in length. Under its western side small vessels may careen alongside the rocks.

Beacon.—Near the center there is a remarkable round hill, 100 feet high, and on the summit a well-built solid stone pillar, 28 feet high, which is the first object seen from the offing, and an excellent guide.

Exuma Harbor.—The eastern channel lies between the small, low rocks, about 4 miles to the eastward of the beacon, and N. 11° E. (N.

10° E. mag.) of the ruins of Rolle Town, which are conspicuously situated on the east end of the rising ground on Great Exuma. Man-of-War Cay extends off about a mile from this part of the shore, and on its north side are the ruins of a small battery. No safe directions can be given for this channel, the pilotage depending entirely upon the eye.

The western channel is 3 miles to the NW. of the beacon, and is much easier of access than the other. The opening between Conch and Channel Cays is a mile wide, and serves to point it out, for the low, small rocks lying between Stocking Island and the former cay are close together. The entrance, however, is barred right across, leaving a small cut, 400 yards wide, close up to the reef, which runs off about 400 yards from Conch Cay; 21 feet may be carried through this cut into an anchorage, with 5 fathoms water, within 200 yards of the SW. side of the above reef. It is, however, scarcely safe in the winter season, as it is quite exposed to northwesters.

Directions.—The mark to cross the bar is Industry tree (a remarkable large tree, standing on the summit of the highest hill on this part of the shore), in line with the east side of some small, low, black rocks, named Smith Cays, lying under it, a short distance from the land, bearing S. 11° W. (S. 10° W. mag.), but the vessel should be hauled up the moment she is within Conch Reef, for the space is very confined. As before stated, vessels of 11 and even 12 feet may proceed as far as they like to the eastward, provided they take high water to cross the flats westward of the beacon. All these outer cays lie within about ½ mile of the edge of soundings, and commence nearly abreast the middle of Little Exuma, about 3 miles from the shore.

Little Exuma Island is very narrow and low. It contains about 160 inhabitants, and the chief settlement is about 3 miles from the east end in the vicinity of a valuable salt pond. There is anchorage off this part of the shore, but it is an extremely exposed position, and only visited by a few small vessels, who take a favorable opportunity to ship the salt. Those employed for this purpose generally come from Nassau, with a pilot on board, and no stranger should attempt to approach this island without one.

Off the east end of the island are some small cays. White Cay, the most distant, is 11 miles from the nearest part of Long Island.

Long Island is 57 miles long in a SE. by S. and NW. by N. direction, and at the south end, which is the broadest part, it is 3½ miles across, but in several places it is scarcely a mile. The west side of the island is only navigable for boats and very small coasters.

From the north end of the island a reef runs off ½ mile, and the bank extends about a mile outside that. There are also some detached reefs off the NW. point of the island, near the edge of the bank, about a mile from the shore. Temporary anchorage will be found about 3½ miles SW. of the point, just within the edge of soundings, by picking out a clear spot, but be very cautious in rounding the north end of the island.

From thence the bank sweeps round to the SW. towards the Exuma Islands, and for about 13 or 14 miles it appears to be quite clear of danger for a space of 2½ miles within the edge.

From the north end the coast trends SSE. to Turtle Cove, and then turns sharply to the eastward to Clarence Harbor, forming a deep bight, which should be avoided, as a heavy sea generally rolls in on this side of the island and the shore is rocky and steep-to. A bank of moderate depth extends out at least 4 miles to the NE. of Clarence Harbor, but its exact limits have not yet been determined.

From Clarence Harbor the coast curves around to the southward to South Point. At about 4 miles northward of the point Mayors Hill rises to a remarkable sharp peak 150 feet high, and between it and the harbor the interior is cut up by numerous salt ponds. At 1½ miles NE. of South Point there are some conspicuous white cliffs about 50 feet high.

From South Point the western shore trends NNW. for about 14 miles, and then bends round westward, forming an extensive bay. Soundings extend from 1½ to 4 miles off this part of the shore, and good anchorage will be found anywhere with the prevailing easterly winds. The most convenient position for communicating with Clarence Settlement is with Stephenson Rock bearing N. 56° W. (N. 57° W. mag.), in 7 or 8 fathoms water, 2½ miles offshore, where there will be room to weigh should the wind veer to the westward. Stephenson Rock is 25 feet high, and lies about 1½ miles from the shore and N. 45° W. (N. 46° W. mag.) from the south end of the island. Pineapples are extensively grown on this island.

Water.—Abreast Stephenson Rock there is a well of excellent water near the beach.

Clarence Harbor is formed between the shore and some small low islets which extend off about 1½ miles to the NW. It is capable of admitting a few vessels of 13 feet draft, but, being open to the northward, it is much exposed and frequently very difficult to get out of. The assistance of a pilot is necessary.

Supplies.—Wood and water may be obtained in Clarence Harbor; also a small supply of beef and vegetables.

Directions.—Should a vessel be forced to run into Clarence Harbor without a pilot, the following directions may be useful: The south shore of the harbor is skirted at the back by a ridge of low hills, and on the western fall of the highest part there is the ruin of a large building, and about one mile to the NW. of it, at the end of the ridge, a house, and near it a flagstaff. Run in with the staff in line, with Harbor Point bearing S. 14° W. (S. 13° W. mag.) until Lark Point bears S. 56° W. (S. 55° W. mag.) when haul up to S. 34° W. (S. 33° W. mag.) and anchor in 18 feet water just within the west end of Strachan Cay. A beacon 40 feet high is erected on Lark Point, the SW. extreme of this cay, to point out the position of the harbor.

The channel within is little more than 200 yards wide, and the outer part generally shows itself on either side by the breakers, which extend out nearly 400 yards from the Booby Rocks off the north end of Strachan Cay. Being open to the NNW., it is by no means a desirable place in the winter months for large vessels that can not get under shelter of the cay. The salt ponds are close to the shore, very productive, and the salt is readily shipped.

Tides.—It is high water, full, and change in Clarence Harbor at 8h. 30m; springs rise 4 feet; neaps 2½ feet.

The Jumentos Cays.—From near the west side of Long Island a range of low narrow islets and small barren rocks, lying nearly on the edge of the bank, sweep around in a curve to the west and SW. to Water Cay and Flamingo Cay, which is 129 feet high and the highest of the group. From Flamingo Cay the range of islets trends about S. by E. for 40 miles to Great Ragged Island. The islets are generally called the Jumentos, but the pilots and wreckers give this name only to those lying northeastward of Water Cay. These are much smaller and lower than the others; indeed most of them are only a few feet above the sea. There are several wide openings in the chain navigable for vessels of light draft, and which might be used most advantageously in crossing the bank; but the islets are so much alike that until they are distinctly pointed out by beacons it would be extremely rash for a stranger to attempt to pass through, without a thorough knowledge of the locality and experience in the navigation of these banks.

Pear Cut, the nearest opening to Long Island, is about 53 miles westward of Stephenson Rock, between Pear and Nobush Cays, but it is only fit for small coasters, which find a passage thence along the south side of Exuma, and through the sand bore channels into the Tongue of the Ocean.

Man-of-War Channel, 55 miles from the south end of Long Island, and about NNW. 35 miles from an offing 7 miles east of Ragged island, is by far the best of all the openings. Here a depth of 4 and 5 fathoms may be carried on to the fairway of the bank, avoiding the rocky heads, which may be seen from aloft, provided the sun is astern of the vessel and the sky is not overclouded. The opening between Man-of-War and Jamaica Cays is 3 miles wide. The former is 80 feet high, the latter 35 feet, and Flamingo Cay, 5 miles northward of the latter, being 129 feet above the sea, while the islets to the southward are all very much lower, the opening is somewhat easily recognized. This is the northermost channel navigable for any but very small coasters.

Directions.—As the pilotage will mainly depend on the eye, and judgment of the depth over coral patches—which, however, should not be trusted without very great experience—a constant lookout should be kept, and when running with the wind aft, and the small clouds moving slowly, called by the pilots "flyers," the navigator will be very apt to be deceived by their reflection on the water over the clear white sandy

bottom, having all the appearance of a rocky shoal. It will, however, always be prudent to avoid a dark spot.

Nurse Channel lies about S. 69° W. (S. 68° W. mag.), 58 miles from the south end of Long Island, and 3 fathoms water may be carried through it, taking care to steer clear of the heads. The bottom, however, at the entrance and for some distance in, is rocky, and being dark is alarming, especially where the strong tide ripples over the ledges. To the southward of this opening the cays lie close together, and are from 50 to 70 feet high. On the east side of Nurse Cay there are some remarkable sand cliffs 50 feet high, and on Channel Cay, 21 feet high, there is a beacon 39 feet in height, which serve as good guides. To the northward of the channel the small barren rocky islets are much lower and more scattered.

Racoon Cut, lying 10 miles further south, is the last of the openings, and is about 7 miles northward of Great Ragged Island. It is, however, so narrow and winding as to be difficult of access to any but small vessels, as the channel south of the sand spit, extending a mile westward from the south end of Racoon Cay, carries only 12 feet. Racoon Cay has about 25 inhabitants on it, and possesses good water and a valuable salt pond, and the salt is conveniently shipped from an anchorage close under the west side. Vessels bound here for this purpose, drawing over 12 feet, had better take the route around the south end of Ragged Island, and haul in round Darvill Spit.

Great Ragged Island is nearly 4 miles long in a NNW. and SSE. direction, and the southern half is about 1½ miles broad, but the northern portion is merely a narrow neck of low land; near the south end a woody hill rises to the height of 95 feet above the sea, on which there is a beacon. About 700 yards N. 22° W. (N. 23° W. mag.) of Beacon Hill is a flagstaff. The island contains about 160 inhabitants, and possesses a valuable salt pond, but supplies are scarce.

Water.—The south end of the island forms a sandy bay, and near the center, not far from the shore, there is a well of good water. There is also a more convenient well and with better water, in a small bay about halfway along the west side of the island.

Ragged Island Harbor.—At the north end of Great Ragged Island, between it and Hog Cay, there is a small harbor capable of receiving vessels of 13 feet draft. The entrance lies close to the southward of Black Rock, off the SE. rocky headland of Hog Cay, between it and the outer bar reef, lying in the center of the opening. In 1877, from 11 to 13 feet were found where 16 to 20 are marked on the plan, north of the outer bar reef. The reef is probably extending itself to the northward. The usual anchorage for vessels wishing to communicate with Great Ragged Island is off Hog Point, as being quite as convenient and more easy of approach than Ragged Island Harbor. The channel is, however, only 100 yards wide, with a depth of 13 feet across the bar at low water. The ebb runs out with great force, but with the usual winds

blowing strong there will be great risk in attempting to beat out, except in a handy fore-and-aft rigged vessel that can insure staying.

In a case of sheer necessity a vessel may run in by the eye with the assistance of the plan, by bringing Pig Point, the SE. extreme of Hog Cay, to bear S. 60° W. (S. 59° W. mag.), and steer for it, which will lead between Black Rock and the outer bar reef, until Pig Point and the north end of Pigeon Cay are in one; then steer so as to pass 100 yards from Pig Point, and anchorage may be taken up as convenient. But a stranger should take a pilot, who will be at hand by making the usual signal in time. Small coasters find their way out over the bank to the westward.

Little Ragged Island is 1¾ miles long NW. and SE., and from ½ to a mile broad. Its north end is low, and separated from Great Ragged Island by a little opening nearly blocked up by small cays and rocks, and under their lee there is an excellent boat harbor, which is entered from the westward. Off the SE. end of the island are several small low rocky islets, steep-to, having a depth of 4 and 5 fathoms 400 yards outside them. Nearly 1½ miles S. 61° E. (S. 62° E. mag.) of the southern islet named South Rock, and 1¾ miles N. 66° E. (N. 65° E. mag.) of Hobson Breaker, there is a small rocky patch, with 16 feet water on it and 5 fathoms round it.

Hobson Breaker is a small rock, lying S. 15° W. (S. 14° W. mag.) 1½ miles from South Rock. It is just level with the sea at low water, and always breaks even in fine weather. There is a clear passage on either side of it.

The Brothers are a group of rocky heads, among which are two small black rocks about 5 feet high. The easternmost, named Lloyd Rock, lies S. 5° E. (S. 6° E. mag.) 5½ miles from Hobson Breaker; the other, called Icely, is a mile farther westward. On the south side they may be approached to about a mile, but a dangerous cluster of coral patches extends 4 miles to the northward of them, leaving a clear channel, 1½ miles wide, between it and Hobson Breaker. It will be better, however, to pass to the northward of the breaker, between it and the shallow sand spit which runs off about 2 miles WSW. of Little Ragged Island.

Anchorage.—There is good anchorage under the west side of this latter spit in 3 fathoms water, with the south end of Little Ragged Island bearing S. 83° E. (S. 84° E. mag.), and Wilson Point N. 7° E. (N. 6° E. mag.). In standing in, however, take care to avoid several small coral heads, which are easily seen from aloft.

Tides.—It is high water, full and change, at Ragged Island Anchorage at 8h. 15m., and the rise 4 feet.

Cay Verde.—This narrow islet is about ⅔ mile long NW. and SE., covered with low sea-grape trees and prickly-pear bushes, and frequented by large flocks of boobies and man-of-war birds. The north end is low, but the south point rises to a hill 72 feet high. On the west

side there is a projecting sandy beach, skirted by a ledge of rocks dry at low water, which makes landing difficult. There is anchorage under this side in 7 fathoms water, but not to be recommended, as a heavy swell rolls round both ends of the cay in strong breezes. A small cluster of low rocks lies off the NW. point, and ½ mile NNW. of them there are a few more just awash at high water with 4½ fathoms between the clusters, over a dark rocky ledge. From the outer rocks a shallow ledge runs off NNW. 2½ miles.

Cay Verde lies about a mile from the SE. extreme of the Great Bahama Bank, the east side of which from this position takes a northerly direction for 7 miles, and is clear of danger; it then bends round to the NW. for 6 miles, and becomes extremely dangerous. Thence the edge of the bank trends westerly about 12 miles, and in this space there are a few small shallow heads, which may be seen in clear weather; within them the ground is clear white coral sand for 8 miles to the southward; the edge then curves a little to the southward, and trends for about 15 miles westward towards the north end of Ragged Island, and is quite clear.

Cay St. Domingo.—This little cay, only about 300 yards long and 15 feet high, is on the extreme south point of the bank, which forms a narrow tongue. Two miles northward of the cay, on the western edge of the bank, there is a dangerous coral ledge, 3½ miles long north and south, with as little as 7½ feet water on it. The space between is quite clear, and a vessel may anchor here in moderate weather, about midway between the south end of the ledge and the cay.

A reef extends a mile N. 57° E. (N. 56° E. mag.) from Cay St. Domingo, and 3 miles in the same direction from the cay, and near the edge of the bank there is a rocky patch with 8 feet of water, on which the sea generally breaks. From thence the edge of the bank takes a NE. by N. direction 18 miles, and for the first 12 miles it is quite clear; the soundings near the edge are irregular, but a short distance within the depths are 8 and 9 fathoms on a clear sandy bottom. From the above position the bank trends easterly for about 10 miles, and then NE. by E. 8 miles to Cay Verde. All this part is very foul and extremely dangerous. There is a ledge, nearly dry, called the St. Vincent Rock, lying S. 69° W. (S. 68° W. mag.), 11½ miles from Cay Verde, and the bank within it for the space of 7 miles to the NW. is full of dangerous small rocky heads with deep water between.

Magallanes Bank is a narrow coral ledge, about 5 miles long in a NNE. and SSW. direction, lying N. 50° W. (N. 51° W. mag.), 28 miles from Cay St. Domingo, and eastward 13 miles from South Head. On the north end the depth is 5¾ fathoms, in the center 5¼, and towards the south end 8 fathoms.

Great Bahama Bank, South Side.—North of the coral ledge, northward of Cay St. Domingo, the bank is free of danger for 11 miles until within 3 miles SW. of the Brothers, where there are two small heads

of coral lying close on the edge of the soundings, and on which there are only 2 fathoms of water. The westernmost head bears S. 74° W. (S. 73° W. mag.), 4 miles from Icely Rock. At 7 miles N. 52° W. (N. 53° W. mag.) of this there is another small head of 9 feet lying S. 52° W. (S. 51° W. mag.), 9 miles from the hill at Ragged Island. The bank then trends NW. to a dangerous head, which is the SE. extreme of a curious bight, about 10 miles deep, the edge of the bank trending about north from the head for 9 miles, and then curving around to the SW. for 22 miles to South Head. The bank here forms a large rounded head, and near its extremity, in latitude 22° 2′ N., longitude 76° 23′ W., there is a dangerous coral head nearly awash and not easily seen, as the bottom is here covered with dark weed.

A very remarkable feature met with on this part of the bank is dark discolored water, having all the appearance of rocky ground, but which are small circular wall-sided holes or wells, from 13 to 24 fathoms deep, called Blue Holes and Red Holes.

From South Head the bank trends NW. 23 miles, and thence westerly for about 30 miles to Mucaras Reef.

All this part of the bank being studded with numerous small coral heads and ledges, nearly dry in many places, which extend from the edge of soundings to the parallel of 22° 40′ N., is quite impassable to strangers. There is generally, however, a depth of 4 and 5 fathoms between the coral patches, and small vessels trading between Cuba and Nassau manage to pilot themselves across by the eye into the Tongue of the Ocean.

Diamond Point, the SW. extreme of Mucaras Reef, lies S. 49° E. (S. 51° E. mag.), 19 miles from Lobos Cay, eastward 19 miles from Cay Confites, and is extremely dangerous, being almost wall-sided. From it the edge of the bank runs NW. 10 miles to a spot nearly dry, at the east end of the Lavanderas Reef. This space is quite clear, and, in case of need, a vessel may run on it, and anchor anywhere in 5½ or 6 fathoms water, clear sandy bottom, as far as 4 miles within the edge of the bank.

Lavanderas Reef trends W. ½ N. 5 miles, and is a narrow coral ledge quite wall-sided to the southward. The west end lies S. 43° E. (S. 45° E. mag.), 5 miles from Lobos Cay, and the ground between is foul.

Lobos Cay is a small rocky islet about 200 yards in diameter, and only 6 feet above the sea. Anchorage will be found to leeward of it, in 5 fathoms water, with the cay bearing S. 66° E. (S. 68° E. mag.), from ½ to a mile distant; but care must be taken to avoid the shallow sand bores, which will be seen from aloft, about 2 miles to the NW. of it. A vessel may also run round the west end of these ridges by the eye, and anchor anywhere within them. From Lobos Cay the edge of the bank takes a NW. by W. direction for 36 miles to Guinchos Cay.

Light.—A fixed white light is exhibited on Lobos Cay, 146 feet above the sea, and in clear weather should be seen 16 miles.

Guinchos Cay (called Ginger by the Bahama wreckers) is a small islet formed of sand and dead bleached coral, with a few stunted bushes on it. It is nearly the same size as Lobos, and about 6 feet high. About 8 miles NW. of Lobos Cay the edge of the bank becomes foul, and there are several narrow sand and weed ridges, on which there are from 2½ to 4½ fathoms. Anchorage will be found in 4 fathoms water, to the westward of Guinchos Cay, in a small clear space about ½ mile from the cay; to the NW. and west of this, the bank is foul to the distance of 5 miles, but thence 4 fathoms is the least water, near the edge as far as the SW. extreme, 14 miles westward of the cay.

From the SW. extreme of the cay, the edge of the bank takes a northeasterly direction and is generally clear of patches until the latitude of 23° 30′ N. is reached, when it becomes foul.

Tides.—It is high water, full and change, on the north side of the Old Bahama Channel at 7h 40m., and the rise is 3 feet. The stream runs on and off the bank from a half to a knot an hour.

Directions.—Vessels drawing not more than 18 feet may cross the southern part of the bank. To do this the navigator should have local experience of this peculiar navigation or the assistance of a pilot. In coming from the north or NE. with this view the Crooked Island Passage should be taken, and, having verified the ship's position by sighting Bird Rock lighthouse, a course should be shaped for the entrance of the channel which is to be used. These channels are Ragged Island Channel, Nurse Channel, and Man-of-War Channel.

If the Ragged Island Channel be used a course should be shaped from Bird Rock for the hill near the south end of Ragged Island. Great care, however, must be taken in approaching the dangerous part of the bank to the northward of Cay Verde, which should be done, if possible, in daylight, as strong currents are frequently experienced, and vessels should enter on the bank about 6 or 7 miles to the eastward of Ragged Island; the edge at this part is easily seen from aloft. The current will probably be found here, setting either SW. or NW. Should the vessel be set to the northward, Ragged Island will be readily distinguished by its being so much higher than the islets in the immediate neighborhood.

Having entered upon the bank South Rock should be rounded at ½ mile distance. From this point the course is S. 70° W. (S. 69° W. mag.) 8 miles, leaving the Hobson Breaker on the port hand. When the beacon on Ragged Hill bears N. 50° E. (N. 49° E. mag.) haul up N. 33° W. (N. 34° W. mag.) 18 miles. If, after running 9 or 10 miles on this course, there should be less than 3¼ fathoms, the vessel will be a little to the east of her course on the tail of the Darvill sand spit, and should be kept more to the westward till these soundings are reached, and then hauled up again.

Having run the above distance 18 miles, the course will be N. 45° W. (N. 46° W. mag.) 25 miles, which will lead through the narrowest and

worst part of the channel, between the Cochinos and the Nurse sand banks, and a good lookout must be kept for small, black, rocky patches. In running this course the depths ought to be from 4 to 4½ fathoms at low water; if less is obtained the vessel will be too far to the eastward; if more, to the westward; but remember that the east side is always the safest, and take the precaution to measure the lead-line (when wet) to feet between 3 or 4 fathoms, for the soundings on the chart may be fully relied on.

It is high water full and change here at 8h. 0m., and the rise and fall 3 feet; scarcely any tidal stream is felt. Should darkness overtake the vessel before having reached thus far, it will be better to anchor, which may be done anywhere in safety. It would not be prudent to attempt to beat through this part of the channel. At the end of the above course the vessel will be off the north extreme of the Cochinos on the parallel of 22° 42′ N., and a west (S. 89° W. mag.) course will lead off the western edge of the bank to the southward of Guinchos Cay, clear of danger, and in from 4½ to 5 fathoms water all the way. Care, however, must be taken to keep on the above parallel by checking the latitude as often as possible.

Through Nurse Channel 3 fathoms may be carried, taking care to steer clear of the rocky heads. After reaching a point 14 miles S. 84° W. (S. 83° W. mag.) of Nurse Channel Cay beacon the course is N. 45° W. (N. 46° W. mag.) to the parallel of 22° 42′ N.

If approaching the bank from the SE., Cay St. Domingo may be sighted and the bank entered on to the NW. of it; but this requires more than ordinary care. In this case, having rounded the SW. end of the cay within the distance of about ½ mile, steer N. 11° W. (N. 12° W. mag.) for 20 miles, which will bring the vessel to a clear space on the edge of soundings, where she can enter, and 6 miles further upon this course Ragged Island will be sighted bearing N. 45° E. (N. 44° E. mag.), when the route can be taken described above. Great care must, however, be taken when passing the parallel of the Brothers to avoid the two shoals, for these rocks will scarcely be seen from aloft, and the run should not be made without clear daylight.

The bank may also be entered upon at Cay Verde, and perhaps with less risk. In taking this route, having rounded the south end of the cay, steer N. 45° W. (N. 46° W.) 10 miles and then west (S. 89° W. mag.) 20 miles, when the vessel will be up to Little Ragged Island; but on all occasions, when among the shoals, the mariner must endeavor not to steer with the sun directly in his face, which will completely blind him from seeing them even at a veryi short distance.

Remarks.—The Old Bahama Channel has been considered as dangerous and difficult to navigate, but since the establishment of lights on various points on the north coast of Cuba and that on Lobos Cay it need not be so considered. As is the case everywhere in the vicinity of these banks, the navigator needs to exercise vigilance, caution, and

judgment, but with ordinary care this channel presents no special difficulties.

There is seldom any perceptible current in mid-channel; when there is any it appears to depend upon the wind.

Winds.—In the winter season, from November to March, Northers prevail, and should the indications be such as to indicate this change before a vessel has entered the channel, it will be better for a sailing vessel to remain outside, and maintain a good offing to the northward of the Maternillos lighthouse, which will be a good guide, until the wind veers to the eastward of north. Should the vessel have entered the Narrows, it will be better at once to seek an anchorage on the Bahama Bank, through either of the openings between Diamond Point and Guinchos Cay, or run back and take up a position as pointed out above. During the remaining portion of the year the wind prevails from the east and SE., and a vessel will not be exposed to this interruption and risk, except in the case of a hurricane, which, however, seldom occurs in this locality.

CHAPTER V.

BAHAMA ISLANDS FROM THE GREAT BANK TO NAVIDAD BANK.

Little San Salvador Island is about 9½ miles eastward of the southern end of Eleuthera Island, with which it is connected by a bank of soundings from one to 1½ miles broad, on which the depths are from 6 to 14 fathoms. The space between Little San Salvador and Cat Island, whose NW. end is 10 miles NE. of Little San Salvador, is almost filled with small rocks and dry ledges, leaving a single intricate opening about 2½ miles from Cat Island through which small coasters carry a depth of from 2½ to 3 fathoms.

Little San Salvador is 5 miles long east and west and one mile broad.

Cat Island is somewhat in the shape of a leg and foot. The leg portion, from Columbus Point to the NW. end of the island, runs nearly straight NW., about 42 miles; the foot or south side trends westerly about 15 miles. The breadth is from 3 to 4 miles, and its height varies from 200 to 400 feet; it is consequently the loftiest of the Bahamas; the latter height, however, is confined to a small ridge at the NW. extreme of the island. The island is very fertile and generally well cultivated; but, possessing no large salt ponds, the inhabitants are scattered over it from one end to the other.

The eastern side of Cat Island, from Columbus Point to Bird Point, 30 miles distant, is generally rocky, bold, and steep-to; but from thence it becomes foul, and is skirted by a reef which runs round the NW. end of the island at the distance of ⅔ mile. There is shelter for boats within the reef, and deep soundings will be found 2 miles outside.

The features of the southern shore are not quite so regular. At 11 miles S. 79° W. (S. 78° W. mag.) of Columbus Point, the south extremity of the island terminates at some remarkable white cliffs. About 2¾ miles west of the cliffs a dangerous reef leaves the shore and sweeps eastward to a remarkable bluff. This reef is reported to extend round Winding Bay at from ¼ to ½ mile from the shore, with a break near its west end with 15 feet water and having from 2 to 3 fathoms inside it. About midway between the bluff and the cliff there is a small cut, which admits vessels of 12 feet draft into good shelter at Port Howe. This end of the island should be avoided in the night, and very carefully approached in the daytime.

West of Port Howe the land rises into a small peaked hill of some height called the Hawks Nest. Hawks Nest Point underneath it is low

and sandy, and a shallow spit, steep-to, extends westward from it nearly 1½ miles. Thence the edge of the bank takes a NW. by N. direction 30 miles, to within a short distance of Little San Salvador and about 8 miles from the west side of Cat Island. It is clear as far in as the depth of 6 fathoms, and about 5 miles to the northward of Hawks Nest Point there is a clear grassy bottom, with 10 fathoms, shoaling to the eastward to 3 fathoms. On the north part of the bank deep soundings will be found closer to the shore than at the south end. There are two villages, called McQueen and Bight, between Hawks Nest Point and Fernandez Cay; approaching them, the rocky heads, which can be seen when within the 4-fathom line, must be carefully avoided.

Anchorage.—Vessels bound to Bight Settlement, and having passed Hawks Nest sand spit, should not attempt to cross the bank until about 4 miles northward of that sand spit. There is a conspicuous bare patch about 2 miles south of the settlement.

Conception Island is a dangerous uninhabited islet, very irregular in shape, about 2¾ miles in length north and south, and 1¾ miles in breadth near the center, which is its broadest part. Its general height is about 90 feet, but close off the east point there is a small islet ⅛ mile in diameter, and 130 feet high, called Booby Cay. On the NW. side there is a clear open bay, with good anchorage on a sandy bottom, sheltered from NNE., round easterly to SSE. The depth is 6 fathoms about ¼ mile from the edge of the bank, but farther in the bottom becomes foul.

A reef, which skirts the SW. side of the island at the distance of about ⅛ mile, extends in a curve to the south-eastward, and terminates 1½ miles east of the south point, and at its extremity there is a cluster of small dry rocks running to the northward. From a mile eastward of the reef the edge of the bank takes a northerly direction, passing about 2 miles eastward of Booby Cay, and is full of shoals; the approach to this side is extremely dangerous, even in daytime, as the dark rocky heads are difficult to distinguish from the ocean water. The bank extends off 3½ miles from the north side of the island and is equally dangerous; it is pretty clear in the center, with variable soundings; but along its western side there is a dry reef (Southampton Reef) on which the sea always breaks, extending north 3½ miles from some small cays, near the NW. end of the island.

Water.—On the western side of the island, about ½ mile southward of the south point of the NW. bay, is the entrance of a small creek leading into a lake in the center of the island, and near the mouth there is a well of good water.

Current.—The current in the neighborhood of Conception Island generally sets strong to NW.

Rum Cay is about 9½ miles in length, east and west, 5 in breadth at the east end, and 2 at the west. The SE. end rounds a little, and forms two remarkable white cliffs about 90 feet high, which may be

seen by day 9 to 12 miles off; several of the hillocks on the cay are somewhat higher than this. A reef commences at the south point of the cay, and sweeping off nearly a mile from the shore, terminates off some dry wells at the SE. point; it is nearly steep-to, and should be carefully avoided in the night. The eastern side of the cay to the northward is bold and free of danger; and a bank of soundings extends from it 3 miles, and runs out in a spit to the northeastward 5 miles from the NE. end of the cay, on which the depths are from 12 to 20 fathoms.

North Side.—The north side of Rum Cay, from about 2 miles to leeward of the NE. point, is foul all the way to the NW. point, for about ½ mile from the shore, and the soundings extend off about a mile, increasing in distance to the westward. From the NW. point a narrow spit of a dangerous reef extends out in a northerly direction for upwards of 2 miles.

West End Anchorage.—Temporary anchorage may be found in 7 fathoms water on the edge of the bank, off the west side of the cay, about ¼ mile off shore, with the NW. point bearing N. 1° E. (north mag.), and the SW. point, which is low and sandy, S. 52° E. (S. 53° E. mag). There is an excellent salt pond at this end of the island, and the salt is easily shipped at this anchorage in moderate weather.

St. George Bay.—From Sandy Point, the SW. extreme, the shore trends eastward to within a short distance of the south point of the island, when it bends round to the SE. and south, forming St. George Bay, at the head of which is the principal settlement, and near it a valuable salt pond. The bank extends southward about 2 miles from the shore, with a general depth on it of from 4 to 6 fathoms, but from Sumner Point, the south extreme of the cay, the edge of the bank is fringed by a narrow broken ledge of coral, which extends westward about 5 miles, with from 9 to 15 feet water on it, and on which the sea breaks in heavy weather.

Within the reef there is excellent anchorage in St. George Bay, secure at all times except in the hurricane season. Vessels leaving the anchorage at Rum Cay for the northward had better pass round the west end of the cay, but they should clear Conception Island before dark, as the current frequently sets strong to NW.

Port Nelson.—The entrance to this anchorage westward of the settlement is through a break in the reef about ¼ mile in breadth, and the least water is 4 fathoms. The channel, however, is intricate, and should not be attempted by a stranger, although the bottom is easily seen, but the least dark spot would probably mislead. Stand in with two small houses on Cotton Field Point, about 1¼ miles westward of the settlement bearing N. 13° E (N. 12° E. mag.) until the wharf of the settlement bears S. 89° E. (east mag.); then steer for the wharf and anchor in 4 fathoms water, fair holding ground, and well protected from all winds.

The entrance through the reef is known by the white house, which can hardly be mistaken; the depth of water is about 4½ fathoms, and a

vessel can anchor anywhere east or west of the entrance in 5 fathoms, but not with it open, as a rather heavy swell sets in.

Or a vessel may steer in between Sandy Point and the west end of the reef fronting St. George Bay. This passage is clear of danger, but such as may be avoided by the eye.

Supplies.—The water on Rum Cay is of good quality, but the supply is small. Fresh meat and poultry may be obtained.

The Currents are variable, and irregular in force. They may generally, but by no means as a rule, be expected to set strongest at full and change of the moon, and then to NW. or SE.

San Salvador or Watling Island is about 12 miles in length north and south, and from 5 to 7 in breadth; its shores are slightly indented. The interior is largely cut up by salt-water lagoons, separated from each other by small woody hills from 100 to 140 feet high; it is, however, considered to be the most fertile of the group, and raises cattle and the best breed of sheep in the Bahamas. The inhabitants, about 500 in number, are scattered about the island; there is no safe anchorage except at the north end, where there is a reef harbor for coasters.

A bank, with from 6 to 15 fathoms water on it, over a dark bottom, extends 2½ miles S. 44° E. (S. 45° E. mag.) from the SE. point of the island, and on the inner part of it, at about ½ mile from this point, are some small but remarkably high black rocky islets, named Hinchinbroke Rocks.

The eastern shore of the island is fringed with a reef for about ⅓ mile, which sweeps around the north end of the island 3 miles from that shore. On the eastern shore soundings extend outside the reef a mile, and 1½ miles from the north end of the spit.

There are several small cays on and within the reef off the north side of the island. White Cay, so called from its appearance, is the northernmost, and lies about ¾ mile from the NW. extreme of the reef. About a mile northward of the NW. point of the island is Green Cay, and round the south end of it is the channel, with 7 feet water, leading into the anchorage for coasters.

The bank does not extend more than ½ mile from the west side of the island, in many parts much less, and the edge is generally very foul. There is anchorage with the usual winds in about 8 fathoms, off the principal settlement named Cockburn Town under Riding Rock Point.

Vessels should anchor as soon as soundings of from 5 to 8 fathoms are obtained as the edge of the bank is very steep. The SW. end terminates in a long and low sandy point which is steep-to. About 2 miles eastward of the SW. point, in a small bay just under some houses on rising ground, there is a confined anchorage for small craft under the lee of the reef, which extends a short distance from the shore.

Gardener Rocks.—A buoy formerly marked these rocks.

Light.—A lighthouse 50 feet high stands on the summit (named Dixon Hill) near the NE. point of Watling Island. From it is exhib-

ited a double-flashing white light, every half minute, showing two flashes of two and a quarter seconds' duration each, with an interval of four and a half seconds between the flashes. The light is elevated 165 feet above the sea, and should be visible in clear weather from a distance of 19 miles.

The light is partially obscured by high land on the southern and western parts of the island between the bearings of N. 1° W. (N. 2° W. mag.) and N. 6° E. (N. 5° E. mag.), N. 8° E. (N. 7° E. mag.), and N. 66° E. (N. 65° E. mag.); and from N. 74° E. (N. 73° E. mag.) to S. 87° E. (S. 88° E. mag.).

Caution.—From the lighthouse the outer edge of the reef bears N. 22° W. (N. 23° W. mag.), distant 5 miles. Mariners are cautioned against approaching too closely the reef surrounding Watling Island.

Samana or Atwood Cay is 9 miles long in an east and west direction, and about 1½ broad. Its surface is hilly and uneven, and about one-third the way from the west end it rises to the height of 100 feet; it is uninhabited, and lies entirely out of the usual track of vessels. The north side of the cay runs nearly straight and is skirted by a reef for about ½ mile. On the north side, about 1½ miles from the west end, are three dry rocks close to the edge of the reef; the west point is low and sandy, and from it a narrow reef nearly dry and steep-to extends westward. This very dangerous reef is said to extend from 4 to 5 miles from the west end of the island, the extreme point lying 2 miles farther out than is represented on the charts. From the west end of the cay, the southern shore trends ESE. 3 miles, when it falls back to the northward and forms two small bays. A dry reef sweeps out to the southward in front of the bays, and within it at the eastern end are two small cays. There is here also a remarkable white cliff, and the shore thence trends ENE. 4 miles to the east point of the island. About ½ mile from the east point is a cay a mile in length east and west, and 75 feet high, and 2 miles east of it another, much smaller and lower. The reef which skirts the southern cays continues in an unbroken line for more than a mile eastward of the latter islet, terminating in a detached breaker at the eastern extreme.

Anchorage.—There is anchorage in 8 fathoms of water, on the SW. side of Samana Cay, about 2 miles from the west point, and 600 yards offshore, but the holding ground is not good.

Water.—Good water can be obtained by digging wells.

Crooked Island Passage is the best one for vessels bound to the northward or northeastward from the passage between Cuba and Haiti. It is also constantly used by vessels bound from the United States to ports on the south side of Cuba, to Jamaica, and the Isthmus of Panama.

Since the establishment of the excellent lights on Bird Rock, Castle Island, and the Great Inagua, there is not the least difficulty.

Currents.—Before Bird Rock light was established several vessels

were lost on Watling Island, being swept there by the current, which almost everywhere through these islands sets to the westward at the rate of from ½ mile to a mile an hour.

This set is occasionally stronger or weaker, according to the varying force of the trade wind. In the neighborhood of Conception Island it is said generally to run strong to the NW. Some observations tend to show that after Northers, or on the increase of the moon, the current sets to the NE., and on the decrease of the moon, as it approaches to change, there is a similar set to the SW.

In November, 1890, the U. S. S. Enterprise found the following currents:

Between San Salvador and Bird Rock, off Crooked Island, a current was found of about ½ knot setting WNW.

Between Castle Island and Cape Maysi the current encountered was slight at first, setting to the westward, but, on approaching Cape Maysi, and after sighting the light, a current was found of about 1½ knots per hour setting to the westward and gradually decreasing in force until after the light bore west (S. 89° W. mag.), when the current changed to the southward and westward with gradually diminished force.

Directions.—From the Southward.—If intending to take this passage it will be advantageous to get well up under the NW. end of Haiti before shaping the course for Castle Island. In the winter season, however, when the wind generally blows hard from the ENE., accompanied by a strong lee current and heavy sea, this will be a tedious matter, and it may be found more convenient to double Cape Maysi as soon as it can be given a fair berth.

From a position 10 miles eastward of the cape the course to Castle Island will be about N. 10° W. (N. 11° W. mag.) 115 miles, but the current must be allowed for, and other circumstances of wind and weather. There will not be much difficulty in this, for if there is a current it will be found running directly across the vessel's track either way, but seldom to the eastward.

Having passed Castle Island, the course to the south end of Fortune Island will be N. 10° W. (N. 11° W. mag.) 27 miles, and thence to the NW. end of the Bird Rock Reef, north (N. 1° W. mag.) about 20 miles. No current will be found under the lee of the islands. Should the vessels be caught in the Crooked Island Passage by a northwester, instead of beating about, which would be attended with considerable risk, it will be better to seek shelter, when the wind has drawn round that far, under the south end of Fortune Island; or run out and keep under the lee of Acklin Island, under easy sail, until the wind draws round to NE., which it will do within two or three days.

Should the wind veer to the southward before the vessel has entered the passage she may haul round the NW. end of Great Inagua, and pass out on either side of Mariguana, but this should be done in daylight and a wide berth given to Hogsty Reef.

Diana Bank bears S. 10° E. (S. 11° E. mag.) 19 miles from the south end of Long Island. This bank of sand and coral, 4 miles in extent east and west, and 3 miles north and south, has from 9 to 15 fathoms of water on it, and 20 fathoms on its edge, and may be made a useful guide to vessels beating through Crooked Island Passage in the night.

The Crooked Island Group of islets rises from a triangular-shaped bank. Bird Rock, the NE. point of Acklin Island, and the SW. point of Castle Island form the angular points.

Bird Rock, about 10 feet high, lies N. 22° W. (N. 23° W. mag.) about a mile from the NW. point of Crooked Island. Close to the southward of it there is a narrow intricate opening in the reef leading into a small well-sheltered basin named Portland Harbor, in which there are 3½ and 4 fathoms water; but it requires the assistance of a pilot. Vessels approaching the light must pay careful attention to its bearings, as the point of the reef extends about 1½ miles northwestward of the tower and the current to the northward of Crooked Island is variable.

Light.—On Bird Island from a stone tower, a white light revolving every 1½ minutes is shown at an elevation of 120 feet, and should be visible 17 miles.

Crooked Island, the NW. on the bank, has an anchorage near its SW. end on the edge of the bank full ¾ mile off shore, but not to be recommended. Thence the western side of the island trends NNW. ½ W. 9 miles; the shore is low, woody, generally foul, and the edge of the bank is about 600 feet off shore. Three miles inland, the Blue Hills rise to the height of about 200 feet.

A dangerous reef extends off NW., 2 miles from the NW. point of the island; it then bends round gradually to the east and ESE. and skirts the northern shore at the distance of about a mile. From the NW. point of the island the northern shore takes an ESE. and SE. direction 11 miles, and then trends eastward for about 8 miles, to its east end. At the bottom of the bight are the Major Rocks, and about 4 miles to the eastward of them Mount Pisgah rises abruptly from the shore to the height of about 200 feet.

Crooked Island Anchorage is 2½ miles southward of the NW. point, nearly abreast a remarkably large house standing close to the shore.

Landrail Point, a short distance to the northward of it, is low and rocky and has a small flagstaff near the extremity. The shore to the northward of this forms a low, sandy beach.

The Anchorage must be approached with great care, under easy sail, and be prepared to come-to the moment the soundings are obtained, or to back off if necessary. The edge of the bank will be seen from aloft; the bottom is sand and grass, good holding ground. In the winter season it must be left the moment the wind veers to the southward of east, but in the summer months a vessel may remain, as the wind is generally light from this quarter; it will, however, be more prudent to keep off under sail.

During strong westerly winds the best landing place is close northward of Landrail Point, inside a reef running a little to the northward, and which affords shelter.

Supplies.—A supply of stock and vegetables may generally be obtained here, but it will probably detain a vessel some hours.

Water.—There are some wells of good water on the south end of the island, called the French wells; but as the anchorage here is full ¾ mile from the shore, it is inconvenient for watering. There is also a convenient well of excellent water near Landrail Point, and a good landing place on the beach northward of it.

Tides.—It is high water, full and change, at Crooked Island, at 7h., and the rise about 2½ feet.

Fortune Island or **Long Cay** is separated from Crooked Island by a small channel through which wreckers drawing under 7 feet water find their way into shelter from NW. winds. The island is 9 miles in extent NE. by N. and SW. by S., varying its breadth from 1¼ miles at the south end to barely ¼ mile at the north extreme. About 2 miles from the south end a hill rises gradually to the height of 110 feet, and is a good landmark approaching either from the northward or southward. Near the center of the island, on the west side, is Alver Town, the chief town and post-office, and at the back of it a very productive salt pond. The whole shore is steep-to; nevertheless, with the usual easterly winds, the few vessels that come here for salt find anchorage off the pond, but so close in that there is no room to swing, and it is dangerous; they must be prepared to quit the moment a change threatens. Small vessels will find anchorage in 5 fathoms on a sand spit, off the town, with the Lookout (a conspicuous wooden structure) bearing S. 55° E. (S. 56° E. mag.).

With strong NE. winds there is a heavy sea along the west coast of Fortune Island. Good anchorage may be then found in from 4 to 5 fathoms about 600 yards southward of the south point of the island.

There is frequent communication by steamers to and from the United States and the West Indies, as also with Nassau by schooners.

Fish Cays.—From the southern end of Fortune Island the bank curves into the SE. to the Fish Cays and then takes a southerly direction to Salina Point.

Anchorage.—Abreast Fish Cays the edge of the bank is clear for about ⅛ mile inwards, but elsewhere it is foul and dangerous, until close up under Fortune Island, where there is a clear space on which a vessel will find good shelter from Northers on excellent holding ground, with the south point bearing N. 33° W. (N. 34° W. mag.), distant ¾ mile, and a small sand bore, which breaks, S. 83° E. (S. 84° E. mag.). Be careful not to shoot in too far, as the ground becomes foul a very short distance within the line of soundings.

Acklin Island, the largest of the group and containing about 400 inhabitants, is separated from Crooked Island by an opening about 2½

miles wide, but so shallow that it may be waded across at low water. The extreme length of the island from the NE. to the SW. point is 43 miles, and its breadth varies from about one to 7 miles. A bank of soundings extends east and NE. 4 miles from the NE. point, having a general depth of from 5 to 12 fathoms on it; but S. 72° E. (S. 73° E. mag.), 4 miles from the point, there is a dangerous rocky patch nearly awash, called Northeast Breaker, about ¼ mile in extent, which generally breaks. It lies within ¼ mile of the edge of the bank, where the depth is 20 fathoms, and bears N. 67° W. (N. 68° W. mag.), 11 miles from the NW. end of Plana Cay Reef.

From the NE. point the eastern shore trends about south 12 miles, with a slight curve inwards, to Creek Point, where the island is a little more than a mile in breadth; the shore is foul to the distance of about ½ mile; about 2 miles from the former point there is a small reef harbor for wreckers. From Creek Point the shore takes a SW. direction for 35 miles, and is skirted by a reef to the distance of from ½ to 1½ miles.

About 9 miles to the SW. of Creek Point, the shore falls back to the westward and forms Abraham Bay, in front of which there is an opening in the reef leading into an exposed anchorage; but this side of the island is very dangerous, and had better be avoided altogether. At the distance of 6 miles N. 68° E. (N. 67° E. mag.) from the south end of the island there is a remarkable prominent bluff headland, named South Bluff, with a range of hills at the back about 150 feet high. Salina Point is on the west side of Acklin, about 3 miles from the south end of that island. The point is low and bushy, but the land rises gradually to the eastward to the heigth of 150 feet. To the southward of the point there is good anchorage in Jamaica Bay, with the prevailing winds, in 9 fathoms water, on the edge of the bank. From Salina Point the coast trends northeastward and the western side of the island is irregularly shaped, and from the shallow water on the bank only accessible to boats or very small coasters.

Castle Island is 2 miles in length in an east and west direction, ⅔ mile in breadth, and about 30 or 40 feet high. The SE. end forms a remarkable bold sand cliff; the SW. end runs off to a low sandy point. The edge of soundings is not more than ¼ mile from the south and west sides of the island; but a bank with 6 to 12 fathoms on it extends off to the distance of 3 miles from the east side, and then trends towards South Bluff of Acklin Island. A chain of small dry rocks runs to the northward for about 1½ miles from the NE. end of the island, half way to the south end of Acklin Island. The NE. rock (Castle Rock) is very remarkable, resembling an old castle. Between it and Acklin there is a passage for boats.

Light.—On the SW. point of Castle Island, and 270 yards from the extreme, stands a conical tower 114 feet high, from which is shown a fixed white light which illuminates an arc of 330°; it is 123 feet above the sea, and visible 17 miles.

The Mira Por Vos are a cluster of small low, barren, rocky islets

at the north or thick end of a pear-shaped bank, 11 miles in length SSE. and NNW., and 6 miles in breadth about 3½ miles from its NW. extreme. The north isle, named North Rock, is about ½ mile in length NE. and SW., very narrow, and from 15 to 20 feet high. It lies about ½ mile within the edge of the bank, and the soundings around it for about 400 yards are from 5 to 9 fathoms.

Northeast Rock lies S. 52° E. (S. 53° E. mag.), about 2 miles from North Rock, and is of about the same dimensions, This islet is foul to the NE. to near the edge of the bank, a mile distant; to the NW. a ledge extends off ¾ mile, and between it and North Rock the depths are 5, 6, and 7 fathoms; to the SW. it is connected to South Cay by a reef nearly dry, on which there are several dry rocks.

South Cay is the largest of the cluster, being ¾ mile in length NE. and SW., and nearly ½ mile in breadth. Close off its eastern side there is a remarkable square black rock. In the center of the cay there is an uncultivated salt pond; and on the south shore are two remarkable sand hills about 30 feet high, which may be seen from the SE. point of the bank. In moderate weather, with the usual easterly winds, a vessel may anchor about ½ mile from the west end of this cay, in 8 or 9 fathoms, clear sandy bottom.

To the SE. of the above cays there are several detached coral ledges, on which their are only 3 fathoms water, and a heavy swell generally rolls over them, which renders them dangerous. The outermost to the SE. lies S. 44° E. (S. 45° E. mag.) 4¾ miles from the sand hills on South Cay, close also to the eastern edge of the bank, and S. 51° W. (S. 50° W. mag.) 9 miles from Castle Island. It is 2½ miles within the SE. extreme of the bank and 1½ miles from the SW. side. In these directions the soundings are from 7 to 10 fathoms, which depths will be carried all along from 1½ to 2 miles within the western edge of the bank up to South Cay. The lead will therefore be of great use in approaching from these quarters, and a bearing of the cay will indicate when southwestward of the coral ledges.

Tide and Current.—It is high water, full and change, at the Mira Por Vos Islets, at 9h. 30m., and the rise is about 3 feet. The current generally sets SW. over the bank a mile an hour.

The Plana or Flat Cays are two islets eastward of Acklin Island, and are separated from each other by a narrow channel. The eastern cay, which is 5 miles long east and west, and nearly a mile broad, is skirted by a reef extending ⅛ mile from the north and south sides, and ¾ mile from the east end. The west end of the cay forms a narrow point, is steep-to, and at about a mile from its extremity there is a hill 70 feet high, but the rest of the cay is low and flat. A bank, 3 miles broad, extends ESE. nearly 4½ miles from the east end, and the general depth on it is from 5 to 8 fathoms; but on the southern edge there are some dangerous shallow spots, and the whole bank being a dark rocky bottom not easily distinguished, this end of the cay should be approached very cautiously.

The western cay is oval-shaped, 2¾ miles long NNE. and SSW., and 1⅓ miles wide. A reef extends 2½ miles northward from the NW. end, and at the north extremity it is nearly dry; it then turns to the SE. and joins a cluster of dry rocks, about ¾ mile northward of the NE. point of the cay. A bank extends off ½ mile outside the reef to the NE., and a full mile to the eastward of the NE. point, to within ½ mile of the eastern cay. All the eastern side of the cay is fringed with a reef for about ¼ mile terminating at the SW. sandy point.

Anchorage.—On the west side of the Western Plana Cay, near the SW. point, there is a clear bank of soundings extending about ⅛ mile from the shore, on the edge of which anchorage will be found in about 7 fathoms water, with room enough to weigh, should the wind come unexpectedly from the westward.

Water.—At the back of the SW. point of the Western Plana there are some wells of excellent water, a little behind the sand ridge; the casks can be rolled up and rafted off very conveniently; indeed, it is the best place for watering among these islands, with the exception of Nassau.

Mariguana Island is generally low, and thickly wooded. Near the center of the island there is a hill 110 feet high, and toward the east end there are several small hummocks from 40 to 60 feet high. Abraham Hill, at the back of Start Point, is about 80 feet, and a long flat ridge behind the SE. point 90 feet high. There is no good water to be found on the island, but wood in abundance. The island is 24 miles in length and from 2 to 6 miles in breadth.

The north side is indented with a few small exposed bays, and skirted by a reef along its whole length, which terminates about 1½ miles northward of the NW. point; about 1¼ miles N. 57° E. (N. 56° E. mag.) of this point, on the edge of the reef, there is a cluster of high rocks. Under the lee of this spit there is good shelter for small craft, passing by the eye, close round the NW. point.

The west side runs nearly straight SSW. 6½ miles, and is bold, the bank not reaching more than 100 yards from the shore.

From the SW. point the southern coast takes an easterly direction for about 4 miles and then trends SE. to Start Point; to the NW. of the point, the bank extends out for ½ mile, with a clear, sandy bottom. Eastward of Start Point, the shore trends to the NE. and east, forming a deep bight, called Abraham Bay. A dangerous reef sweeps round between the points of the bight at the distance of about 2 miles from its head, and is steep-to. About a mile eastward of Start Point there is a small opening through which, by the eye, coasters may carry 2 fathoms into good shelter within the reef. From the east point of the bay the coast takes an E. by N. direction for about 4 miles to the foot of the center hill at the narrowest part of the island, which is here 2 miles across, and then trends round SE. for nearly 8 miles to the SE. point. Off the latter portion the bank extends about ⅛ mile.

East Reef.—A dangerous reef commences at the SE. point, which extends to the eastward about 9 miles, and is 2 miles in breadth. At the SE. extreme of this reef are several dry rocks just above water, and at the NE. elbow there is a small low cay of rock and sand, a few feet high. On the south side of the reef, about 4 miles eastward of the SE. point, and nearly south of a small cay which lies close off the NE. point, there is a little opening through which small craft find their way into snug anchorage under the above cay. The extreme east end of the reef is 4 miles from this cay, which appears as part of the island, except on a NNE. and SSW. bearing. The reef is steep-to on the south side, but soundings on the bank will be obtained within ½ mile of the east and north sides.

Little Inagua Island is somewhat quadrangular in form, 8 miles in length, east and west, and about 5 miles in breadth. At the center of the NW. side there is a flat hill, about 60 feet high, which is the only rising ground on the northern part of the island, and on the south side there are several hills of about the same height. A dangerous reef, steep-to, runs off ¾ mile from the east end, and there are generally heavy breakers on it.

The NE. and NW. sides of the island, each about 5 miles long, present a bold rocky shore, with soundings on a clear bottom to the distance of about ½ mile. The SW. side appears also to be free of danger. The SE. side is about 8 miles long. Eastward of the south point there is a small bay, and in front of it snug anchorage for small craft, protected by the reef, which terminates near the middle of this shore. The entrance to this anchorage is through a break in the reef about 2½ miles eastward of the point. There are no inhabitants, but there are said to be wild hogs on the island, and, if so, water.

Great Inagua Island.—There are several small elevations on the south side, generally about 30 feet high, appearing from the southward like separate islands. Salt Pond Hill, the highest of them, is, in the evening, sometimes taken for the SW. point of the island when coming from the southward. Several wrecks have, from this cause, taken place. The island can not generally be seen from a distance on account of fogs and mist which frequently hide it.

North Coast.—From Saline Point, near the NW. point of the island, which is low and rocky, the northern shore of Great Inagua takes a northeasterly direction 7 miles to Palmetto Point. The reef which protects Alfred Sound comes gradually home to this point, and ENE. about 5 miles from Northwest Point there is on the edge a small cay about ½ mile long. Three-quarters of a mile eastward of the cay, and N. 5° W. (N. 6° W. mag.) from a black isolated rock on the beach there is a small cut through the reef, in which there are 8 or 9 feet water; the reef runs quite straight and is steep-to. Carmichael Point is about 6 miles from Palmetto Point, and the coast between forms a bay about 1½ miles deep, with a bold rocky shore all round steep-to. Midway there

is a conical mound called James Hill, about 90 feet high, which is remarkable as being the only elevated ground on the north side of the island westward of Carmichael Point.

From Carmichael Point to the NE. point of the island, 23 miles, the shore falls back to the southward and forms an extensive bay, 8½ miles deep, named Ocean Bight. On the east side the bank runs off about ¼ mile from the beach, but the head and the western shore are steep-to, and present a bold rocky coast, against which the sea breaks with great violence, particularly during northerly winds. At the head of the bight there are a few hills from 70 to 90 feet high.

East Coast.—The whole eastern side of the island is skirted by a reef, from 200 yards to ½ mile from the beach, with the bank outside it for about ½ mile. Towards Northeast Point there are some sand hills rather higher than the rest of the coast, off which the reef extends nearly a mile, falling in to the point in a curve.

Statira Shoal.—From the SE. point of Great Inagua a spit or tongue of the bank, from 4 to 2 miles in breadth, runs off SSE. for 6 miles, and on it is a rocky patch. It is about ½ mile long, with as little as 6 feet water on it, breaks in heavy weather, and lies southward 3 miles from the SE. point; S. 44° E. (S. 45° E. mag.) 1¾ from Sail Rock (a small black islet 20 or 30 feet high, bearing S. 23° W. (S. 22° W. mag.) 1½ miles from the point) and S. 84° E. (S. 85° E. mag.) 9½ miles from Lantern Head, a remarkable prominent bluff 82 feet high.

The position of this shoal is only ⅓ mile from the eastern edge of the bank, but the soundings are from 6 to 8 fathoms for 2½ miles to the southward, and the same depth for 1½ miles to the westward of it, so that the lead will give sufficient warning from these quarters, but not from the eastward. There are 6 fathoms between it and Sail Rock, and about 5 fathoms between the latter and the main. The water on the bank being of a dark color, it is difficult to distinguish the shoal, except in heavy weather, when the sea always breaks.

South Coast.—From the SE. point the southern shore trends westerly about 28 miles to Southwest Point. On either side of Lantern Head the land bends inward, forming bays. The shore is skirted by a reef for about 2 miles, which terminates about 5 miles to the westward of the head; but the shore to Southwest Point is still foul to the distance of about a mile. To the eastward of the head, S. 19° E. (S, 20° E. mag.) of Lagoon Hill, there is an opening through the reef capable of admitting small coasters to a snug anchorage within. The interior, however, is so completely studded with small coral heads that the eye alone must be depended on as a guide. The bay on west side of the head is only safe with the prevailing trade wind, which is here more regular than at the islands to the NW. About 4 miles eastward of Southwest Point the lands trends round to the SSW., forming a bay, and is very low and foul.

Molasses Road.—About 2 miles eastward of the Southwest Point

there is a rocky ledge about ½ mile in extent, east and west, called Molasses Reef. It is steep-to, and the sea breaks on it with easterly winds. Molasses Road is a clear spot eastward of the reef, where vessels driven from the anchorage on the west side of the island may ride out NW. and north winds in safety. The ground, however, is flat and rocky, and they must weigh the moment the wind draws round to the usual quarter.

The best berth will be in 8 or 9 fathoms, just within the edge of soundings, and about a mile eastward of the reef, with Salt Pond Hill N. 9° E. (N. 8° E. mag.) and Southwest Point open to the southward of the reef S. 85° W. (S. 84° W. mag.) Great care, however, must be taken in approaching, for with the wind offshore the reef does not show itself, and the discolored water is not easily seen at even a short distance; care must also be taken not to shoot too far in, and be prepared to anchor the moment soundings are struck.

West Coast.—From Southwest Point the low sandy shore sweeps round to the NW. for about 2 miles, and is foul to the distance of from 200 to 400 yards; it then takes a northerly direction 6 miles to Middle Point. This point is tolerably clear of danger. North of Middle Point the coast recedes and forms Man-of-War Bay.

Mathew Town Road lies abreast of the small settlement from which the anchorage takes its name. The village is scattered along the shore, with large salt ponds behind it. On a small rocky point near the northern end of the village is Henrietta Fort.

With the usual trade wind the only safe anchorage is off the village in 4½ and 5 fathoms water, about 600 yards offshore, and near the edge of the bank of soundings.

For a man-of-war the best anchorage is with Fort Henrietta bearing N. 79° E. (N. 78° E. mag.)

Stand in slowly and be ready to anchor as soon as white water is reached, which may be recognized from aloft. If the weather threatens a change the vessel must leave at once and run around to Molasses Road, as soon as the wind is to the northward of west. Before such change of weather the barometer usually falls to about 29.80.

Water can always be procured from Mathew Town. Vessels can at any time call in for provisons, water, or to make temporary repairs without payment of pilotage or port charges.

Pilot Fees.—Vessels of 30 and not over 50 tons burden, $1.92; 50 and not over 75 tons, $2.40; 75 and not over 100 tons, $2.88; 100 and not over 150 tons, $3.60; 150 tons and not over 200 tons, $4.86; 200 and not over 250 tons, $6.06; 250 and not over 300 tons, $7.29; and for every 20 tons over 300 tons at the rate of 24 cents. Double the above rates for piloting vessels into Alboys Hole, Alfred Sound, and Man-of-War Cay Anchorages.

Tides.—It is high water, full and change, in Mathew Road at 8h. 0m. The rise is 3½ feet at springs and 2 feet at neaps. The flood sets to the southward along the west side of the island at the rate of about half a

knot, and meets the flood coming from the eastward off Southwest Point.

Lights.—On the shore, about a mile southward of Mathew Town, and 2 miles NW. of Southwest Point stands a white conical tower, 114 feet high from which is shown a revolving white light, 120 feet above the sea, attaining its greatest brilliancy every minute, visible 17 miles.

Making this light, pay attention to its bearings, as it is seen over the land when not intercepted by objects, which is becoming more frequent by the growth of cocoanut trees.

A light is shown from staff in front of the customhouse when steamers are expected.

Man-of-War Bay is a bight 6 miles wide between Middle and Northwest Point. The bank extends about ⅓ mile from the shore all around the bay, affording anchorage on the edge, and shelter from all but westerly winds. With north and NW. winds, the best berth will be in the northern part of the bay, with the outer point N. 67° W. (N. 68° W. mag.); with south and SW. winds, off the sandy beach in SE. part. There is no anchorage off the south shore. In anchoring the same precautions must be observed as when coming-to in Mathew Road, and care taken to pick out a clear sandy spot.

Water.—The well is 200 yards inland from the north end of the southeastern sandy beach. The water is generally brackish, except after heavy rains, when there is always an abundant supply. The path to it is rocky and uneven and not at all adapted for rolling casks.

Alfred Sound.—The NW. point of Great Inagua is low, the tops of the palmetto trees on it being only about 20 feet above the sea. From thence the shore bends round to the eastward for 2¾ miles to Saline Point, forming a sandy bay. A reef nearly dry at low water, and steep-to, skirts this bay about 1½ miles from the shore, and within it is Alfred Sound, a snug anchorage for small craft drawing 6 feet, over white coral sand and patches distinctly seen. The entrance lies between Northwest Point and the west end of the reef. There is also a narrow, intricate cut through the barrier NE. about 1¼ miles from the point. With the wind to the southward of east a vessel of 12 feet draft may anchor in the opening to the westward, named Alfred Road, taking care not to bring Northwest Point westward of S. 23° W. (S. 22° W. mag.); but it is by no means a desirable anchorage.

Water.—Near the middle of the beach there is a well, and firewood may be obtained near the shore of the bay in Alfred Sound.

Tides.—It is high water, full and change, in Alfred Sound, at 8h. 0m. Springs rise 3½ feet, neaps 2 feet. The flood stream sets eastward, the ebb westward, at the rate of about half a knot.

Doubtful Shoals.—Clarion Shoal, SE. of Great Inagua, and Cuidado, south of Mariguana, have been repeatedly searched for and not found. They are carried on the charts as doubtful. Breakers were reported in the position of Clarion Shoal in September 1889.

Brown Bank is in latitude 21° 29′ 52″ N., longitude 74° 44′ 6″, W. It extends 2 miles east and west, and one mile north and south, is composed of sand and coral, and can be seen under very favorable circumstances. There are from 9¾ to 17 fathoms water on it.

Hogsty Reef is in shape like a horseshoe, convex to the east, 4½ miles in length east and west, and 2½ miles in breadth. The reef forms a good harbor, with a depth of from 3½ to 5 fathoms. There are few black rocky patches on the clear white sand, but they may be easily seen and avoided.

At each end of the horseshoe there is a small low sandy cay, nearly devoid of vegetation. There is a tank for rain water on Northwest Cay. The reef extends about a mile to the WNW. from South Cay, and the passage in lies between it and Northwest Cay. There is good anchorage just inside the edge of soundings, in 6 fathoms, to the southward of Northwest Cay; but there is plenty of room to work up the horseshoe if necessary.

Vessels bound through Crooked Island Passage, and being so far to windward may use the anchorage at Hogsty Reef for the night in preference to that under Great Inagua; it will, however, be prudent to avoid so dangerous a bank altogether. It is seldom that any weather current will be found here, but it has been noticed. The run should be regulated, if possible, to get through the passage with daylight.

The Caicos Group consists of a number of small islands and cays, rising from a large, shallow sand bank, having a very irregular outline.

It is extremely dangerous on every side, particularly so on the southern part. Nowhere in this portion of it can a sheltered anchorage for a large vessel be found. The northern, and a large part of the eastern, edge is formed by a chain of narrow wooded islands, with few inhabitants. They produce a very small quantity of fruit and vegetables for the markets of Nassau and Turks Island. Most of the inhabitants are fishermen and wreckers.

The six principal islands of this group are West or Little Caicos, Providenciales, North Caicos, Grand Caicos, East Caicos, and South Caicos.

Philips Reef.—From Cape Comete, the NE. extreme point of the group, a bank extends eastward for 5 miles; it then trends to the SW., and reaches the shore about 4 miles southward of the cape, off Goods Hill, at the SE. end of East Caicos. On the northern edge of this bank is Philips Reef, a dangerous coral patch about ½ mile long, which always breaks, and is steep-to on the northern side. The bank does not extend more than ½ mile northward of the reef; to the eastward it runs off 2 miles, and the depths are from 10 to 20 fathoms, and to the southward from 7 to 10 fathoms, so that vessels approaching from these latter quarters should pay great attention to the lead. In a case of necessity vessels may pass between the reef and Cape Comete, where the depths are 6 and 7 fathoms.

Grand Caicos Island.—From Cape Comete the northern shore of East Caicos Island forms a deep bight and trends westward for about 8 miles to its west end, which is separated from Grand Caicos by a passage for boats. The shore of this latter island runs to the NW., forming an indentation for about the same distance to Haulover Point, its north extreme; near the point there is a square house, and a large settlement on its east side; the land is of uniform height. All this part of the shore is skirted by a reef for from one to 2 miles, leaving shelter inside it for boats.

To the northward of Haulover Point the reef extends eastward at least 2 miles, and under it there is anchorage for small vessels in case of necessity. The anchorage is open to the eastward, and a heavy swell generally rolls in, but there is always a strong outset, which would enable a handy vessel to beat out in moderate weather. From Haulover Point the shore trends slightly round to the westward for about 10 miles to Juniper Hole, the opening between Grand and North Caicos. There is shelter here for boats between two conspicuous bluff points.

Caution.—Strangers, however, should not approach this part of the shore. There is a strong indraught into the bights, which is felt at the distance of 5 or 6 miles, and would prove fatal in the event of a calm, as it is steep-to outside the reefs.

North Caicos Island.—The north side of this island is skirted by a reef ½ mile from the beach, and at the NE. point a dangerous ledge extends off for 2 miles. Outside both the ledge and the reef there is a bank of soundings about a mile wide, with 10 and 12 fathoms on it. This part is easily recognized, as the shore rises into a succession of hillocks about 100 feet high, and on the western of them is a large square house. Near the west end, within the reef, are three small, dark, conical islets, about 50 feet high, called the Mary Cays. The coast here takes a SW. direction for 15 miles into a deep and dangerous bight skirted by a reef about a mile from the shore.

Water.—Between the North Caicos and Providenciales there is a continuous range of small cays; and on one of them, called Fort George, a low sandy islet covered with brushwood, about 7 miles SW. of the Mary Cays, there are some wells of indifferent water, and the remains of a small fort and magazine. The reef under it forms a small, well-sheltered harbor, carrying a depth of 2½ and 3 fathoms.

Providenciales.—The NW. end of this island is 18 miles from the Mary Cays, and terminates near its extremity in a peaked hill of moderate height, upon which there is a pile of stones erected as a beacon. From the peak the land falls to the NNW. into a low sharp point, bordered by a dangerous reef which extends off for 2 miles, with shoal soundings outside it. On the west side of the point a bank extends off for ½ mile, upon which there is anchorage in what is called Malcolm Road.

The west side of Providenciales trends to the southward, forming two bays, each about 4 miles wide. The south extreme terminates in a

bold white rocky bluff, nearly 5 miles N. 56° E. (N. 56° E. mag.) of the north end of West Caicos. From the south end of the north bay, or Malcolm Road, a dangerous reef extends off S. 56° W. (S. 56° W. mag.) 7 miles, and near the end there is a small dry sand bore lying about 3 miles northward of the West Caicos. A reef also stretches off a considerable distance from the latter island towards the spit of the former, leaving between them a vein of deep water 800 yards in breadth at the entrance, carrying from 5½ to 2 fathoms, and running in to the eastward for 3 miles, or until at a distance of 2 miles from the south bluff of Providenciales.

A vessel may anchor southward of the sand bore in about 5 fathoms water, sheltered by West Reef as far round as NNW. This, however, is not so good an anchorage as that under the south end of West Caicos. With the prevailing easterly winds, vessels under sail should wait for the flood tide before attempting to beat farther up Caicos Creek; the deep vein of water may be easily seen from aloft, and the reef to the northward protects the anchorage from northerly winds. The bluff or SW. point of Providenciales, bearing N. 85° E. (N. 85° E. mag.) clears the shoals on either side.

Caution.—Vessels from the northward are apt to mistake the Providenciales for the West Caicos, and by hauling round the west end to the southward after dark get wrecked on West Reef. With the chart, however, and proper attention to the latitude, this ought not to happen, for the West Caicos could not be made upon any bearing to the westward of south without being close to the west side of Providenciales or near West Reef. There is also 10 miles difference of latitude between the NW. end of the Providenciales and West Caicos. The spit of West Reef bears SW. distant 10 miles from the NW. point of Providenciales, and extreme care should be taken in rounding it in the night.

West Caicos Island is about 7 miles long in a NNE. and SSW. direction, and 1½ broad, and is nearly of a uniform height of about 50 feet. Near the SW. point, however, there is a small hill 65 feet high, and another of 60 feet near the north end. The west side is steep-to, the bank extending only 200 yards from the shore, and in many places even less. The island is uninhabited and there is no water.

Anchorage.—There is good anchorage under the south side of West Caicos, in Clearsand Road, with 5 and 6 fathoms water, sandy bottom, sheltered as far round as west, and plenty of room to weigh with any wind. The best berth is in 5 fathoms, with the SE. hill bearing N. 11° W., (N. 11° W. mag.), just within the edge of the bank. Vessels caught in the Caicos Passage with a strong NW. or NE. gale, which may be expected from November to March, will find this a very convenient anchorage, the southwest reefs breaking the sea during the latter.

South Caicos Island. Cockburn Harbor.—From Cape Comete the eastern shore of the cays on the east side of the bank takes a southerly direction 13 miles, when it makes a sudden bend to the westward for 2

miles and forms the south end of South Caicos. Long Cay, which is about 3 miles in length NE. and SW., but very narrow, lies to the westward of the south end, and is separated from it by an opening 800 yards wide, called East or Cockburn Harbor.

Cove Cay is a rocky islet in the entrance. The channel is to the westward of it.

A pilot (procurable at Grand Turk Island) is necessary to enter the harbor.

Buoys.—Five buoys have been placed in Cockburn Harbor. Vessels usually drop an anchor to leeward of one of these buoys, and make fast to it with a hawser to assist the anchor, as the bottom is hard rock and very smooth. The best berth is with the west point of Cove Cay bearing S. 73° E. (S. 73° E. mag.), about 300 yards distant. If desirable a ship may anchor outside the harbor, with the flagstaff on Government Hill bearing north (north mag.) and the east end of Long Cay N. 73° W. (N. 73° W. mag.).

The best outside anchorage is in 6 fathoms with the east end of Cove Cay in line with the flagstaff on Government Hill. Abreast of Cockburn Harbor the bank of soundings should be cautiously approached. A pier from the shore toward Cove Cay is proposed.

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Long Cay Anchorage.—From the south end of Long Cay a reef extends a short distance. Between the west side of the cay and a cay about a mile to the westward of it, is a small but sheltered anchorage. A good berth is with the south point of Long Cay bearing S. 68° E. (S. 68° E. mag.)

Light.—A fixed white light is shown from Government Hill at an elevation of 50 feet and should be visible 9 miles. It illuminates an arc of 270° between south (south mag.) and east (east mag.).

NOTE.—The light is established for the local traffic between Cockburn Harbor and Grand Turk. As the lightkeeper does not vist it during the night, the light is not always to be depended on.

Caution.—The light is obscured over an arc of 90° between the bearings south (south mag.) and east (east mag.), and any vessel within 9 miles north or northeastward of Cockburn Harbor, not seeing this light, should stand to the southeastward for safety.

Ambergris Cay, lying 8 miles from Long Cay, and 2½ miles from the edge of the bank, is 3½ miles long north and south, and about a mile broad. A hill in the middle of this cay rises to the height of 100 feet, and there are some remarkable white cliffs on its SE. side. About 2½ miles northward of this islet are Fish Cays, ¾ mile within the edge of the bank.

Little Ambergris Cay lies a short distance westward of Ambergris Cay. It is about 4 miles long in an east and west direction, but very narrow, and so low as not to be easily distinguished from the edge of soundings.

Swimmer Rock.—This dangerous rocky patch is about ½ mile in extent, with less than 2 fathoms water on it. The White Cliffs on Ambergris Cay bear from it N. 22° W. (N. 22° W. mag.) 13 miles. The rock is steep-to on the east side, but the SE. point of Caicos Bank terminates about 2 miles S. 11° (S. 11° E. mag.) of it, in which direction there are from 8 to 10 fathoms water. The edge of the bank along the east and south sides, being covered with dark weed, is not easily distinguished. From the SE. point the edge trends to the WNW. for about 8 miles, and then bends round to the SW. for about the same distance, to the south extreme of the Caicos Bank.

Whale Breaker lies in the bight, 5 miles westward of the Swimmer, on the edge of soundings, and is a dangerous, small, rocky patch, even with the surface of the sea. In heavy weather it breaks, spouting up the water to a considerable height—hence its name. There are several other dangerous spots along the southern edge of the bank; the southernmost, called South Rock, has only 10 feet water on it, and lies south (south mag.) 8 miles from Shot Cay, one of the Seal Cays.

West Sand Spit.—From the south extreme of the Caicos Bank the edge takes a NW. direction in a wave line for about 29 miles to the south end of west sand spit. This sand spit lies north and south along the edge of the bank for 2 miles, nearly awash, and its north end dries at low water. It is called Sand Cay in the old charts, and its north end bears S. 56° E. (S. 56° E. mag.) 24 miles from the south end of West Caicos.

For the first 17 miles from the south end of the bank its edge is quite clear, and comes within 8 miles of White Cays, the westernmost of the Seal Cays; but thence to the West Caicos it is very dangerous. All this side is of a light green color, forming a strong contrast with the deep blue tinge of the ocean water. The color is frequently reflected very strongly on the edge of the clouds, on what is called the bank blink which may be seen many miles.

French Cay.—To the northward of west sand spit the edge of the bank is clear for about 5 miles. It is here that the small coasters and wreckers cross to the eastward, passing off the bank southward of Long Cay. The edge now trends WNW. about 4 miles to French Cay, which is a small, low bushy islet, about ¼ mile in diameter, covered with prickly pear, and frequented by great numbers of aquatic birds; from April to July large quantities of eggs are collected by the fishermen. A vessel may anchor under its lee in 6 fathoms, on the edge of soundings. From this cay to the West Caicos there is scarcely a clear space, and the bank all along is very steep-to.

Turks Island Passage, Directions.—This passage is much frequented by vessels bound to the southern ports of the West Indies, but the Mona Passage is much safer.

If it is intended to use this passage, it will be well, especially if at all doubtful of the ship's position, to reach the parallel of 21° 40′ N. (9

miles northward of the latitude of the light), 60 miles to the eastward of it.

Having arrived at this position, and no land being in sight, the ship is sure to be to the eastward of the island, and should then be kept west (west mag.) to pass 8 or 9 miles to the northward of the light. Being visible from deck at a distance of 15 miles, it will almost certainly be seen. Every opportunity must be used by night or day to verify the latitude This is the more necessary as frequently to the northward of these passages the current runs strongly to the north, and if the vessel should pass the light without its having been seen a serious disaster might occur. After making the Grand Turk light every precaution must be taken in rounding the north point of the island.

From a position 3 miles westward of the lighthouse, a S. 25° W. (S. 25° W. mag.) course for 26 miles will carry the navigator 4 miles to the westward of Endymion Rock, and 8 miles eastward of the Swimmer Rock.

The current in Turks Island Passage is said to be very feeble, and the tides not felt, but strong currents have been met running through the passage. The local pilots state that they run very strong, but always through the channel in a NE. or a SW. direction. The tides are very strong sometimes, having a strength of 3 knots.

In this region, during the winter months, if the wind hauls from SE. to south it is an almost certain indication of a sudden change to the NW. Under these circumstances, it would be better to remain under short sail to the northward of the islets, keeping the light in sight till the change of wind has taken place.

If, after having entered the passage, the wind dies away and hauls to the southward, it would be advisable, instead of trying to beat to the southward, to anchor in some one of the places to the westward of the cays.

Ballast Ground.—The least depth found on this shoal, lying off the town on the western side of Grand Turk Island, was 8½ feet, from which the NW. extreme of Grand Turk Island bore N. 3° E. (N. 3° E. mag.), and the Lookout bore N. 70° E. (N. 70° E. mag.).

Within a depth of 3 fathoms the Ballast Ground extends 70 yards northward of the shoalest head, 100 yards southward, and 30 yards westward—in this latter direction the bank is steep-to, there being no bottom with 25 fathoms line at 70 yards from the shoalest head.

Wreck on Northeast Reef—Caution.—The wreck stands upright and has the appearance of a vessel anchored off Grand Turk, and may mislead vessels bound southward through the passage. It is doubly dangerous when the reef does not break, and has already caused the stranding of two vessels in light winds and smooth sea.

Anchorage.—When making Grand Turk Island from the NW. a square house at the east extreme of East Caicos Island forms a good mark. Philips Reef generally breaks and is steep-to on the northern

side. The anchorage off the center of the town on the west side of Grand Turk Island is not recommended, as the bottom has been rendered foul by the discharge of ballast.

An anchorage can be had off the town, both northward and southward of the ballast ground; that to the northward is not recommended to sailing vessels.

Man-of-War Anchorage, so called by the pilots, is on the edge of the bank, which shows white, in from 6 to 9 fathoms water, with the president's flagstaff (1½ or 2 miles southward of the town) bearing S. 42° E. (S. 42° E. mag.), and the lighthouse N. 17° E. (N. 17° E. mag.). But should the vessel swing inshore she will tail on or near a rocky patch, with not more than 17 feet water on it. Vessels must therefore be prepared to weigh or slip the moment the wind threatens a change, but between the months of April and August it never shifts from the eastward without ample warning. Those merely wishing to communicate should remain under sail. It is better for strangers to take a pilot. The difficulty in using these anchorages is in shooting in, which requires great judgment; in a sailing vessel, the better way will be to keep the topsails at the mast head ready to throw all aback. This, however, must depend upon the strength of the wind, for care must be taken not to bring up too short, or the vessel will drag off, or hook her anchor under a rock and probably lose it.

Riding Place, a little southward of Government house, also affords better anchorage than that off the town, and there is less surf for landing.

Hawks Nest is the anchorage under the south side of the island, and in the event of a vessel being obliged to quit that off the town, she will find this a safe roadstead until the wind draws around again to the eastward. The assistance of a pilot is absolutely necessary, and vessels drawing over 17 feet should not attempt it at all.

A reef, which runs SW. 3½ miles from the south point of the island, protects the anchorage from west to NW., and about ½ mile from the point there is a small intricate opening in it, called the Small Cut, for vessels of 10 feet draft; and a mile from the point there is a larger one, called the Great Cut, in which the depth is 15 feet.

Directions.—For Hawks Nest, the best channel is round the SW. end of Southwest Reef, as there will then be room to beat up. In this case, should the wind be well to the northward, a vessel may haul round the reef, with the east end of Cotton Cay touching Pear Cay Hummock, bearing N. 85° E. (N. 85° E. mag.); this mark will lead south of Southwest Bank, about ½ mile to the southwestward, on which there are only 12 feet water close to the edge.

In steering in on this line a cast of 4½ fathoms will be obtained on the edge of soundings, and then 6 and 7 fathoms to within about ½ mile of Cotton Cay. To the northward of the latter cay there is as little as 3½ fathoms right across, but to the eastward of this there are 4 and 5 fath-

oms to the anchorage above the Dunbar Shoals. The whole space is, however, studded with numerous small rocky heads distinctly seen, and in beating up the eye must be the guide. The most convenient anchorage will be found between the Dunbar Shoals and a small sand cay 5 feet high, on Southwest Reef.

This passage is not recommended to vessels coming from the southward and from the northward; except when vessels have a steady favorable wind, and are quite sure of their reckoning, it will be far more prudent to take the Crooked Island Passage. This will relieve them of risk and anxiety, and in all probability cause little if any delay. If bound from Cape Haiti they may take the Caicos Passage, provided the wind be not to the northward of ENE., but it should be done in daylight.

Caution.—If, before recognizing the entrance to Turks Island Passage, the navigator has passed to leeward of it and the Caicos are in sight, care must be taken to pass them well to the northward at a distance of at least 8 or 9 miles. It is dangerous, especially with light winds, to pass nearer to them, for the tides which run in the channels between the islands of the group are very strong and make themselves felt at a distance of 5 or 6 miles.

Turks Islands are the easternmost of the Bahama Group, and rise from a narrow bank extending about 35 miles NNE. and SSW. Near the center of the bank, however, a tongue of soundings extends eastward 7½ miles from East Cay, with a regular depth on it of from 8 to 10 fathoms. The nine islands of the group are composed of sand and sandstone partially clothed with stunted bushes and a peculiar species of cactus somewhat in the form of a Turkish cap; hence, probably, their name. There are no wells, and the inhabitants who reside on Grand Turk Island and Salt Cay depend upon rain water caught in tanks. The Caicos Islands furnish them with ground provisions, Haiti with cattle; other supplies are generally obtained from the United States; so that strangers must not depend upon finding resources here.

These islands belong to Great Britain and are attached to the government of Jamaica.

Grand Turk Island is 5½ miles long, in a north and south direction, and about a mile broad. It is low, except on the east side, which is formed by a narrow ridge of sand hills, about 70 feet high. A dangerous reef extends NE., 2½ miles from the north point, and a narrow ledge of the bank, on which there are from 6 to 40 fathoms, runs off 6 miles farther. The reef skirts the eastern shore at the distance of about 1½ miles, and connects itself to the small islets lying to the SE., as far as East Cay. This little islet, which lies about 5 miles S. 22° E. (S. 22° E. mag.) of Grand Turk, is 96 feet high, and the loftiest of the group. The reef is broken here and there, but there is no safe passage through for strangers. The NW. point of Grand Turk is also foul for ½ mile, and a narrow ridge of soundings runs off a mile outside the reef. The

town, which is the seat of government, stands on the western shore, and in front of an extensive cultivated salt pond.

The United States is represented by a consul and vice-consul.

Steamers.—The Clyde line from New York call every three weeks. Pickford and Black's line from Halifax to Kingston, Jamaica, touching at Bermuda and Turks Islands, call both ways, one steamer a month.

Pilots and Dues.—The pilots are efficient. Half rates charged when pilot's services are offered and not taken.

For anchorage in Grand Turk, Salt Cay, and Riding Place Roadsteads, and Hawks Nest, Cockburn Harbor, and West Caicos, the following rates are charged: From 50 and under 60 tons, $2.40; and 48 cents in addition for every additional 10 tons up to 100 tons. Over 100 tons and under 200 tons, 3 cents in addition for each ton. For 200 tons, $7.86; over 200 tons, 2 cents in addition for each ton. Outward pilotage half inward pilotage, except from Hawks Nest, where it is the same. Removals from one anchorage to another in the Turks Islands, half inward pilotage. A pilot may be engaged by the day at the rate of $2.16 for every 24 hours, for which sum he shall perform all duties that may be required of him as pilot, including removals and anchorages.

Light dues, 8 cents per ton register. No tonnage dues.

Lights.—A circular lighthouse stands 400 yards from the north extremity of the island, from which, at an elevation of 108 feet, a white light revolving every half minute is shown, and should be visible 15 miles.

A fixed red light is shown from a flagstaff on the wharf abreast the anchorage. A harbor light is shown from a beacon 20 feet high, erected near the Lookout on the NW. point of Salt Cay. The light is white and red; the white light is visible 7 miles and the red 2 miles. The arc of red light indicates shoal ground. The light can not be depended upon.

Salt Cay is almost triangular in form, greatest length NE. and SW. The NW. end forms a bold bluff 60 feet high, and on the summit there is a tower from which the light is shown. The town stands on the west side toward the NW. end of the cay, between the beach and a valuable salt pond. The anchorage before the town is considered the best; it will admit vessels drawing 20 feet, and they can get under way in any wind.

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The space between Salt and Cotton Cays is full of dangers, and should not be navigated without the assistance of a pilot.

Sand Cay is nearly divided at the center by a small neck of low, bushy land, so that at a distance, in an east or west direction, it has the appearance of being two islets.

It is clear on all sides but the north. Here a coral reef runs off in that direction nearly 2 miles, and the sea breaks heavily over it, except after very fine weather. There are several small black rocks from 10 to 16 feet high on the reef, the northernmost of which lies about ½ mile

from the north end. The edge of the bank runs almost on a straight line between the reef and the south end of Salt Cay, and this space is quite clear, with regular soundings right across to the eastward, of from 9 to 11 fathoms, white sand.

Three-quarters of a mile S. 22° E. (S. 22° E. mag.) of the cay there are two small black rocks lying close together about 2 feet above the sea; they are steep-to, and have 5 and 6 fathoms water between them and the point, and 8 fathoms at ¾ mile SE. of them. On the edge of the bank, with the center of the cay bearing N. 56° E. (N. 56° E. mag.), there are two patches with 3 fathoms water on them.

From the eastward do not come upon the bank—which extends 4 miles eastward of both cays—until the south end of Salt Cay bears N. 67° W. (N. 67° W. mag.), for the ground to the northward of this line is very foul.

Moderate depths extend 1½ mile westward from Sand Cay, and anchorage will be found here in 6 fathoms water about a mile off, with the gap bearing N. 68° E. (N. 68° E. mag.). Foul ground has, however, been reported; caution should be exercised. A vessel can weigh with any wind, and run off the bank on a south course clear of all danger.

Beacon.—An obelisk, 40 feet in height and painted red, has been erected upon the northern summit (35 feet above the sea) of Sand Cay.

Endymion Rock.—The southern tongue of the bank extends SW. by S. 8 miles from Sand Cay, and on this spit is the Endymion Rock, lying S. 40° W. (S. 40° W. mag), 5½ miles from the south end of the cay, and 400 yards within the western edge of the bank. The rock has only 4 feet water on it, breaks in heavy weather, and is surrounded by a small cluster of rocky heads for ¼ mile. Should the sea not break the rock becomes exceedingly dangerous, as the water over it is so dark that it can not be distinguished from any distance. The bank between it and the cay is quite clear, with regular soundings of from 7 to 9 fathoms; there are 15 fathoms about 1½ miles to the eastward of the rock, and from 7 to 16 fathoms between it and the SW. point of the spit, about 3 miles SSW. of it. The Swimmer Rock, on the SE. point of the Caicos Bank, bears from the Endymion S. 79° W. (S. 79° W. mag.).

To avoid and pass to the westward of this danger it is necessary to steer clear of the white sandy bottom till the beacon on Sand Cay bears N. 54° E. (N. 54° E. mag.). By keeping the beacon on this bearing, the anchorage previously mentioned may be reached. Although no other dangers seem to exist in this region, it will be prudent to keep outside of the sand bank lying south of Salt Cay.

Fawn Shoal, in latitude 20° 51′ N., and longitude 71° 29½′ W., appears to be of small extent, with from 8 to 14 fathoms water on it, and steep-to. Eight days were spent in unsuccessfully searching for this shoal by the U. S. S. Nipsic, in 1873. The reported position of this shoal was examined by H. M. S. Fantome in 1880. The examination occupied five days, but no indications were observed of its existence.

Mouchoir Bank or Mouchoir Carré (square handkerchief), is 31 miles in length, east and west, but irregular in breadth. The southern edge takes nearly a W. by N. direction, and, with the exception of a shallow patch 4 miles within it, appears to be free of danger, having a depth on it of from 9 to 14 fathoms. The eastern side trends northerly 20 miles, and terminates in a long point, or narrow spit; about 1½ miles within the extreme end of the spit there is a small breaker. The outline of the north side is irregular and extremely dangerous to within about 9 miles of the west end, where there is a patch of 6 fathoms. The rocky heads at the NW. extreme of the bank lie about S. 37° E. (S. 37° E. mag.) 21 miles from East Cay of the Turk Island Group.

Silver Bank lies 28 miles to the eastward of the Mouchoir Bank, and 35 to the northward of Cape Francés Viejo. Its eastern side is 29 miles long in a NE. by N. and SW. by S. direction, but bends westward near the middle, and at the bottom of the bight, near the edge, there is a dangerous shoal; its SE. and NE. points appear to have no dangers, but regular soundings from 12 to 15 fathoms.

The north side of the bank runs nearly straight NW. by W. for 38 miles; but about 8 miles from the NE. point it becomes exceedingly dangerous and continues so all the way to the NW. point; and near the middle of this side rocky heads, which are awash, extend 5 miles inwards from the edge. The west side also runs nearly straight north and south 37 miles, on the meridian of 70° W., and 8 miles from the SW. point there is a foul patch close to the edge of soundings; but to the northward of this, to within about 7 miles of the NW. point, the bank appears to be free of danger for some distance inwards.

From the SW. point the south side trends E. by S., 24 miles, and for about the first 8 miles of this distance the edge is very dangerous; but to the eastward of this it appears to be clear; it will be better, however, not to venture on any part of the bank, for it has not been closely examined. As the water on the bank is not discolored, except over the shoals, where it has a white appearance, the lead must be well attended when approaching it from any quarter.

Navidad Bank.—This is an oval-shaped flat bank of coral and sand, 22 miles long, in a north and south direction, and in the center, 11 miles broad, with a depth of from 11 to 17 fathoms. The south end lies N. 23° W. (N. 23° W. mag.), 32 miles from Cape Cabron, the nearest part of Haiti. The water is not sufficiently discolored to render this bank visible.

Between the Navidad and Silver Banks there are three small detached knolls, steep-to, with 10, 12, and 17 fathoms water on them. The supposed position of the Severn Shoal is still shown on the charts, but the neighborhood has been so closely searched that its existence is extremly doubtful.

CHAPTER VI.

CUBA, NORTH COAST.

Remarks.—The coast is very much indented, and the greater portion of the shores very foul and bordered with numerous cays and reefs. The harbors are numerous and excellent. A range of mountains, highest at the eastern end, where an elevation of 7,000 feet is attained, extends through the island from east to west. The land along the shore is generally low and flat.

The coast from Cape Maysi to Cape Cruz on the south and to Point Maternillos on the north, is bold and free of danger, as is the coast line between Havana and Matanzas. The rest of the coast line is foul and difficult to approach.

The climate is hot and dry during the greater part of the year. The warmest months are July and August, with a mean temperature of 82° to 84° F., and the coldest December and January, with a mean temperature of 68° to 70°. The seasons are spoken of as the rainy and the dry, but the line of demarkation can not be exactly drawn. Rain often falls in torrents from July to September, and occasional showers fall for a month or two before and after these periods. Fevers, more or less malignant, prevail from May to November, and to a greater or less extent throughout the year. Of these the yellow fever, to which all the seaports are subject, is the most fatal.

Hurricanes are less frequent than in the islands more to the eastward. In the neighborhood of Santiago de Cuba earthquakes of moderate force are sometimes felt.

In 1883 the population amounted to 1,521,684, of whom 509,143 were blacks.

No connected survey of the shores of Cuba has ever been made.

A large portion of the coast is very imperfectly known, and the navigator must bear in mind that the charts are only approximately correct.

Old Bahama Channel is seldom navigated from to leeward, except by small coasters, which can find anchorage during the night on either side, or by steamers. Vessels coming from to windward, after passing through either of the NE. Bahama Channels, or along the north sides of Puerto Rico and Haiti, generally keep the Cuba shore aboard, where the remarkable highlands enable them to check their reckoning and keep a proper offing, according to the season. The current here usu-

ally runs to the westward, but not strong. If requisite a pilot may probably be obtained from Baracoa. Great care should be taken to avoid the Bahama side.

Some few navigators, however, who have a thorough knowledge of the Bahama Cays and Banks, instead of taking this channel prefer running through the Crooked Island Passage, thence round the south end of Ragged Island, or Cay St. Domingo, and then across the bank inside all the shoals, on the parallel of 22° 42′ N., quitting it either to the northward or southward of Guinchos Cay. Vessels of 18 feet draft may do this, for they can carry from 4 to 5 fathoms all the way, and anchor in safety whenever it is requisite; but it requires a thorough acquaintance with the locality and of the mode of navigating by the eye.

The Old Bahama Channel may be said to extend from Cay Verde to the Paredon Grande Cay on the south, and from Diamond Point to Guinchos Cay on the north. This will make it about 50 miles in length. At the east end, between Diamond Point and Cay Confites, west of it, it is 18 miles wide. In the narrowest part, between the west end of the Lavanderas Reef and Cay Confites, SW. of it, the distance is only 10 miles. It then opens out slightly and very gradually, and at the west end it is about 14 miles across. In direction it turns gradually round from NNW. to WNW., requiring the utmost possible prudence and caution in the night time or thick weather.

Cape Maysi is the eastern extremity of the island of Cuba. When seen from the southward the cape has the appearance of a long low point. This part of the coast is low and covered with brushwood.

One or 2 miles west of Cape Maysi the land begins to rise, and seen from the northward forms three steps, the upper one 1,850 feet high, gradually sloping upward to the eastern summit of the Cobre Mountains. Strangers coming from the northward have mistaken the lower termination of the slope for Cape Maysi, and keeping away too soon have fallen to leeward.

In approaching the eastern end of Cuba from the NE., some of the peaks of the Cobre Mountains form good landmarks. The most remarkable is called El Yunque de Baracoa, or the Anvil, from its shape. It is 27 miles from Cape Maysi and 4 miles from Port Baracoa, for which it is a good guide. In rounding Cape Maysi it should be remembered that the current frequently sets to the westward with considerable strength, especially during the winter months.

Light.—On Cape Maysi, from a circular lighthouse, a fixed white light is shown at an elevation of 128 feet and should be visible 17 miles.

Pintado Point.—About ½ mile southward of Cape Maysi is Pintado Point; thence the coast, composed of soboruco, covered more or less with trees and brushwood, runs southward and SW. for 6½ miles to Negra Point, forming first a projecting cliff and then a bay. Rather

more than ¾ mile from the point is the Cueva de Pintado, a large cave, within which the sea breaks. About one mile southward of the cave is Quemado Point, a little salient.

The Coast of Cuba from Cape Maysi trends N. by W. ¾ W. for nearly 2 miles, to Hembra Point, near which a portion of the coast of about 200 yards in extent is formed of soboruco, and here the light tower stands. About 700 yards northward of the tower is Mangle Point and entrance to the River Maysi, and 600 yards farther on is Estaca Point.

Azules Point.—From Estaca Point the shore, forming a slight bay, trends in a NW. ½ N. direction for a mile to Azules Point; then follows the opening of Azules, where the beach ends, and another portion of soboruco extends for about ½ mile to a small beach 100 yards in extent, and then continues for ¾ mile as far as the beach, which terminates in the northern extreme of the headland of Maysi.

Puertos and Rasita Points.—From Azules Point the coast, after forming three small sandy bays, continues low and of soboruco to a point rather salient, named Puertos, on account of several openings formed by the land in its vicinity, and thence to another point more salient called Rasita.

Maysi Reef.—The headland of Maysi is comprised between Pintado and Azules Points, a space of about 5 miles. It is skirted by a reef at the distance of 300 to 400 yards, which terminates at the latter point; it is awash, the sea constantly breaks over it, and there are several openings through it for boats and very small vessels. The openings most used are those of Hembra, Mangle Bay, or Estaca, leading to the River Maysi, and Azules; the others are not navigable with a fresh breeze. The opening into Mangle Bay is almost always practicable, being about 130 yards in breadth, and 7 fathoms deep, but a rocky head with a little more than a fathom water on it lies on its south side.

This is the only regular anchorage within the reef used by small vessels, where there are 7 and 8 feet water, sand and weed, but seek for a clear place between the rocks.

Maysi Bank.—A rocky bank borders the Maysi Reef, all along, with about 9 fathoms water on it at the distance of 500 to 700 yards, and a mile from it there are from 73 to 90 fathoms, sand, gravel, and rock. Cape Maysi is 200 yards eastward of the meridian of the lighthouse, and where the reef is most dangerous during the night.

Caution.—Vessels from the northward, bound to the southern coast, should be careful to steer sufficiently eastward to clear the reef; and in rounding the cape from the southward the light should be brought well westward before steering northward.

Currents.—Near the land off Cape Maysi the flood runs westward and the ebb eastward. During the summer months, with southerly winds easterly currents will be experienced, and with northerly winds southerly currents.

Baga Point.—From Azules Point the coast begins to rise, and runs about WNW. for 5 miles to Fraile Point. Between Rasita and Baga Points the shore is of soboruco and forms a bay. Baga Point is a little salient, and known by three large rocks above it. About 400 yards within these rocks there is a well of good water, but it is difficult to approach the coast on account of the heavy sea which breaks on it.

Fraile Point.—Rasa Point is next west of Baga Point, and the shore between forms an indentation as far as two large rocks. Thence the coast of steep soboruco continues as far as a large rock called Fria Cave; from here it is of low soboruco, with an inner range of the same kind of cliffs at a little distance from the shore, and continues to Fraile Point. Fraile Point is salient, high, with a rock at its foot resembling a friar's hood hanging down. About 200 yards westward of it there is a spring issuing from the rock. The coast as far as Fraile Point is clear of danger, and thence about 8 miles westward to Port Mata it can be approached to the distance of a mile.

The Coast, from Fraile Point, forms a slight indentation as far as Mangorita Point, which is somewhat salient; and on its eastern part is a small bay, where there are five rocks. The coast then continues straight to the Guanal Leap, which is high and abrupt; thence the shore is of low soboruco to a point a little salient, named Guanal, with a wood of palm trees on it. Then follows Frailecito, similar to Fraile Point but smaller, and lastly that of Silencio. From this point the first part of the coast is of soboruco, and then sand and gravel as far as the mouth of the River Yumuri.

Yumuri Reef.—The River Yumuri runs through a great break in the mountains and empties 800 yards westward of Silencio Point. From this point a reef extends off 100 yards and skirts the shore as far as the mouth of the river, where it joins a gravel bank, which in places is 270 yards from the shore, and terminates at the Redonda Rock, which has a shore of gravel and sand between it and the river

In consequence of the reef and bank, and the narrowness and little depth of the mouth of the river, it is difficult to enter with small vessels unless in the rainy season. The water is drinkable ½ mile from the mouth.

Bariguita River.—Good water may be obtained at its mouth, which is sheltered by a reef of rocks extending 100 yards from the isolated hill. Near Larga Beach Point there is a lake of salt water, but its mouth is only open during the rainy season.

Yumuri Anchorage is in the bay between Silencio and Larga Beach Points, where vessels may anchor in 11 fathoms water, sand and mud, 700 yards N. 43° W. (N. 45° W. mag.) of Redonda Rock, distant 500 yards from the reef. There is no shelter from northerly winds. Besides the reef and bank of Yumuri there are other dangers at this anchorage. The Gorda Rock patch is about 28 yards in extent, and about 200 yards to the NW. of Gorda Rock. The Bariguita Reef extends

off 300 yards from the middle of the shore, immediately westward of Gorda Rock, with various rocks awash, one of which is named Buren. Lastly, Bariguita shoals form a group ½ mile in extent east and west, and 200 yards north and south, in front of the beach of Bariguita, from which it is distant from 200 to 400 yards. The eastern extreme of this group is 300 yards from Bariguita Reef; several of the heads composing it are visible, and between them are 4½ and 5 fathoms water over sand.

Larga Beach Reef.—From Larga Beach Point a reef skirts the coast as far as Mata Point, and in front of Manglito Beach it is about 300 yards off. There is a small opening through it in front of the middle of the Beach of Barigua, with 3¾ fathoms water, black sand, and 1¾ fathoms somewhat more within; and another opening in front of Manglito Beach only a few yards wide and 4½ fathoms deep, coarse sand. From Silencio Point to Mata Point there is no bottom at 90 fathoms, a mile from the land. From the break at the River Yumuri the high mountain covered with trees ranges near the coast to the head of Port Mata.

Port Mata is only fit, from its limited size and shallow water, for small vessels.

The banks which border the shores leave only a space 300 yards in diameter in the middle of the harbor, having a depth of 15 feet.

The entrance is open to the NE., and in the winter months a heavy swell sets into the entrance.

A bank borders each side of the entrance, and a vessel in entering has only to keep in mid-channel, carrying a depth of 4 to 6 fathoms.

Supplies.—Several small streams of good water empty into the harbor and wood is plenty. Fresh provisions may be obtained from the people in the neighborhood.

Tide.—It is high water, full and change, at Port Mata, at 6h. 49m.; and the rise is about 2 feet.

Port Boma.—This harbor is only the mouth of the river of the same name, forming an inlet ¾ mile long and hardly 200 yards wide. The shore at the entrance is of rock, but farther in it becomes a mangrove swamp. The harbor is only fit for coasters seeking temporary anchorage or to load with the products of the neighboring farms. It is open to the northward, and fresh breezes cause a heavy sea to roll in.

Majana Point.—From Boma, the coast of soboruco forming some slight indentations, trends to the NW. 2½ miles to Majana Point, which has two large detached rocks on it. About 200 yards westward of Boma there is a white spot which is seen at some distance and useful in recognizing the port; about ¾ mile farther on there is also a small opening in the soboruco with very white sand in its interior, named Caninguin; and about halfway between this and Majana Point lie some large detached rocks called Herrera.

Miel Bay and Anchorage.—From Majana Point the coast trends

westward for a mile to Rama Point, and then southward, forming a rounded headland, and the points of Guanal, Hondito, and Playuela; from the latter it runs straight to the south of the mouth of the River Miel; here the rocky coast ceases, and the Miel Beach follows, extending west for a mile to the foot of Fort Matachin, of the town of Baracoa.

Between Rama and Barlovento Points is Miel Bay, about ¾ mile in breadth, and somewhat sheltered from easterly winds. When ½ mile westward of Rama Point, steer to the southward until the mouth of the River Miel bears about S. 60° E. (S. 62° E. mag.), and then anchor in 5 or 5½ fathoms water, black sand, 400 yards from the weather shore, which is of rock, and about the same distance from the beach; this is the most convenient berth. This anchorage is open to northerly winds. It is frequented for the purpose of communicating with Baracoa, if not wishing to go there. The river runs for a long distance parallel to the beach and very near it; water may be obtained a short distance from its mouth at low tide.

Supplies.—Water may be had from the river, but it is very shallow in the vicinity of its mouth and dry at low tide. Wood and small supplies of provisions may be obtained.

Port Baracoa may be readily found by the Yunque de Baracoa, or Anvil, 4 miles S. 79° W. (S. 77° W. mag.) from the entrance. This is a remarkable steep and flat-topped mountain, rising to 1,824 feet; may be seen at a distance of 40 miles. It is partly covered with vegetation, and there are some white and red spots in the break or opening in the rock of which it is composed, visible at some distance. It is a most useful landmark, and its shape, resembling an anvil, prevents its being mistaken for any other mountain.

The shores of the port are bordered by a sand bank, which considerably contracts the anchorage. It is exposed to the prevailing winds, which throw in a heavy sea. At about 35 yards to the NW. of the inner point on the SE. side of the entrance, is an isolated rock called the Buren, which uncovers at low tide; the sea always breaks on it; it is steep-to, and the only danger. Vessels generally anchor close up to town in 3¾ to 5 fathoms of water, sand. Except in a small vessel, it can only be left with the land wind; consequently, in the season of the Northers, a sailing vessel will be liable to some days' detention. The bottom in general is loose, and during fresh northerly winds the port offers but little shelter.

The population is about 6,000. There is a hospital on the hill. Salutes can be returned by a battery of four guns on the point. The port is the center of a large fruit trade.

The authorities to be visited are the mayor, commander and the captain of the port.

The United States is represented by a consul and vice-consul.

Winds.—From March to June southerly winds prevail and squalls from south to SW. may be looked for, in fact they should be looked

for at any time. These squalls are of short duration, but a vessel should ride by a fair scope of cable. Remittent fever is at times prevalent at Baracoa, but the place is generally healthy, owing to its exposed position.

Supplies.—Near the pier at Baracoa the River Macaguanigua runs into the sea, where water may be obtained. Fresh meat and fish to be had at all times. Large quantities of fruit are exported to the United States and Bahamas.

Steamers.—Herreras line (Spanish) carrying all mail from and to all points; six mail days per month.

Telegraph.—There is telegraphic communication to Havana and Santiago de Cuba.

Light.—About 150 yards ESE. of Barlovento Point, a fixed white light 50 feet above the sea, is shown from an iron column above the keeper's dwelling, and may be seen 9 miles.

Tides.—It is high water, full and change, at Baracoa, at 7h. 23m., and the rise is about 2¼ feet.

Pilots for the old Bahama Channel may generally be got at Baracoa.

Winds and Currents.—All this part of the coast, from Cape Maysi to Baracoa, is exposed during the winter months to the north and NE. winds, which prevail at this season. During the summer squalls off the land are experienced. The land winds are regular, and spring up fresh generally at daylight, but do not extend far from the coast.

The direction of the current to a short distance from the land is westward with the flood tide and eastward with the ebb.

The Coast from Baracoa trends about NW. ½ N. 9 miles to Bay or Vaez Point, forming first a headland of soboruco, somewhat salient for about a mile, and the points of Camello, Cerro, and Duaba, the latter terminating in a long point, and 300 yards from it the river of the same name runs into the sea. Then follows Duaba Beach, 1,200 yards in length, forming a bay near the mouth of the river, which is generally about 16 yards wide, increasing to 90 yards in the rainy season; it runs parallel to the shore to the end of the beach, and then turns suddenly to the SSE.; the point here is named Jibacon, where the river form an opening during heavy rains.

Next to Duaba Point the Toar Beach runs in a straight line more than a mile to the mouth of the river of the same name, which is about 10 yards wide, but increases during rains; it forms a lagoon with several islets. Then Canes Beach, a mile long, ends at Canes Point, which is the beginning of the rocky coast of the same name. From this point, round, somewhat salient, and known by a large palm tree and a house over it, the coast of Canes and Sigua for more than a mile is of soboruco, which terminates at Sigua, a small bay about 400 yards in extent, only used by very small vessels in fine weather. From Sigua the rocky coast trends westward for ½ mile, forming Maravi Point, as far as the entrance to the port of that name.

Between Baracoa and Bay Point, the coast is backed by high land covered with vegetation to very near the shore. Between Baracoa and Duaba Point, the hill of Jaitecico rises about 600 yards, is about ½ mile in extent, of little elevation, covered with trees, and is useful as a mark. There are 92 fathoms water, about ½ mile from the coast, and 13 to 23 fathoms, sand and rock, 400 yards from it; except off Duaba and Torae Baches, where there are 92 fathoms ¾ mile off shore, and 14 to 46 fathoms at ½ mile.

Water may be easily obtained from the River Duaba; small vessels can anchor near it, in the bight of the rocky coast formed by Duaba Point.

Port Maravi.—Its shores are of soboruco, but on the west there are three sandy beaches. At the head of the port the land is marshy, with mangroves, and here the river of the same name empties. A bank of sand, gravel, and rock borders the shore, contracting the entrance to about 50 yards, and the anchorage to less than 150 yards in breadth. Therefore, although the water is deep, there being from 9 to 15 fathoms, mud and rock, the port is only fit for small vessels, and in entering the eye will be the best guide. A sailing vessel should leave with the land wind in the morning. This port is, however, exposed to the NE. and not a safe anchorage except under favorable circumstances.

Supplies.—Water may be had from the river, but it is very shallow near its mouth, and dry at low tide. Wood and small supplies of provisions may be obtained.

Tides.—It is high water, full and change, at Maravi, at 7h. 56m.; and the rise is about 2½ feet.

Port Cueva.—About a mile NW. of Port Maravi is that of Cueva, and between is the little port of Aguacate, and the two bays of Cay Güin, thus called from some conspicuous houses of that name seen on the coast. This port is merely an inlet of little more than 400 yards, forming an elbow at its extremity with a sandy shore, in the western part of which the river of the same name empties itself. About halfway in from the entrance to the elbow the breadth is only about 100 yards, the shore on either side is of soboruco, and in the middle of the channel the depth is from 9 to 1¾ fathoms, with shallow water on either side; it can only be used by small vessels.

Port Bay.—Close westward of Cueva is the inlet of Bay, and then for nearly ½ mile the coast is low and rocky, terminating in Bay Point, which is rather low and almost separated from the coast, having on its lee side an inlet fit for boats. This point is often named Vaez, but the pilots and seamen of the coasters call it Bay.

Port Navas.—From Bay Point the coast trends about NW. by W. 8 miles to Jaragua Point. Nearly a mile from the former is Naguarage Bay, fit only for boats, and the river of the same name runs into it; thence the rocky coast of Navas, with slight indentations, continues for a mile; and about halfway is a salient point named Plata, on the

weather side of which there is a small white beach and soboruco above it, by which the point is known. About ½ mile beyond this is Port Navas, of circular form, 400 yards in diameter, with 5 to 10 fathoms water, and which affords shelter from the prevailing winds; its mouth is 200 yards wide, open to the north, and there is no difficulty in entering.

Port Cayaguaneque.—From Navas the rocky coast with three small sandy bays, named Cay Santo, runs WNW. for about a mile to Port Cayaguaneque, which is only fit for very small vessels. The channel at its entrance is about 50 yards wide.

Mapurisi Point.—From Port Cayaguaneque the coast is of rock for ¾ mile to Mapurisi Point, which has two small sandy bays on its eastern side; thence for the space of a mile, as far as Nibujon Point, are five small sandy bays and a small opening called Seguro. To the westward of Nibujon Point is the beach of the same name, 400 yards in length, and above it several houses and cottages, and at its western end the river runs into the sea, the water of which is good for drinking. Then follows the rocky coast called Taco for about $\frac{8}{10}$ mile, and then the beach of the same name for 900 yards, which is of rock covered with white sand, and which terminates at the entrance to Port Taco. At the west end of the beach, near the east point of entrance, are some houses.

Port Taco is well sheltered. Its shores are bordered by a bank, which also extends along both sides of entrance to the coast bank outside. The channel at the entrance, which is a little more than 200 yards long, is tortuous and narrowed to about 68 yards in breadth, and the principal anchorage to a space of ¼ mile in a NE. and SW. direction and 350 yards in breadth. The port is therefore difficult and dangerous to enter in a vessel of more than 11 feet draft, although there are 6½ fathoms water at the anchorage, as with a fresh breeze the sea breaks against the rocky shore on the lee side of entrance with much force.

It will be prudent for a stranger to take a pilot for Port Taco, but if unable to obtain one, and in case of necessity, bring the outer of the western points of entrance to bear S. 78° W. (S. 76° W. mag.), distant 400 yards, and then steer for the inner point, which is high, steep, and conspicuous; when 150 yards from it, steer about S. 69° W. (S. 67° W. mag.) for 150 yards, and then about S. 24° W. (S. 22° W. mag.), keeping about one-third the distance across from the lee shore, till within the harbor, when anchor as convenient. The edges of the bank are difficult to be seen until close to them. A vessel must have the land wind to leave.

Supplies.—Water, wood, and small supplies of provisions may be obtained.

Tides.—It is high water, full and change, at Port Taco, at 8h. 49m., and the rise is about 2¾ feet.

Jaragua Point.—The coast for 400 yards westward of Taco is of rock; then the beach of Jaragua for a long ½ mile follows, when the coast is of soboruco and forms Jaragua Point, extending 400 yards

from the reach. From the west point of entrance to Taco a reef skirts the coast, which terminates at this point, and is about 150 yards wide.

Maguana Reef begins 300 yards westward of Bay Point, and ends about midway between Naguarage Bay and Plata Point. Its greatest breadth is about ¼ mile, which is in front of the eastern point of Naguarage Bay. The reef has two openings; that eastward of Maguana is only fit for boats or very small vessels, between the eastern extremity of the reef and the coast, and it should not be attempted when there is a high sea.

The other opening is in the widest part of the reef, and 50 yards in breadth. In the channel within the reef the bottom is sand, with depths of 4½ to 10 fathoms, and which affords good anchorage for small vessels requiring shelter. In order to reach it, skirt the reef by the eye until at the opening, when steer to the southward for about 200 yards in mid-channel, and haul to windward for the middle of that part of the coast of Naguarage which separates the entrance of the bay from the beach of Maguana, and anchor in 1¾ to 3¾ fathoms water, sand. This opening divides the reef into two parts, and a vessel may anchor within on either side in one or 2 fathoms, sand.

Saddle of Bay.—All this part of the coast is thickly wooded, as is the highland a short distance in the interior. Among the various heights the Saddle of Bay rises 1,378 feet above the sea, nearly 3 miles S. 58° W. (S. 56° W. mag.) of Bay Point; its summit forms a saddle or two peaks, and can be seen 42 miles.

Jaragua is a small anchorage where small vessels may lie under shelter of the reef. The break or opening is about 200 feet wide and its edges on both sides are marked by breakers. Just inside the reef, abreast of the opening, are three small islets.

To enter the anchorage, coast along outside of the reef till the eastern point of the southern and largest of these three islets bears S. 67° E. (S. 69° E. mag.). Then steer for this point and anchor according to the vessel's draft of water.

Abreast of the middle islet there are 5½ fathoms of water, decreasing farther in.

This vicinity should be avoided, and when near it the latitude should be frequently and carefully ascertained, especially at night, as a strong indraught is said to have caused many disasters.

The Coast from Jaragua trends first about WNW. and then north, forming a bay, as far as Mangle Point, which is 7 miles from the former. The reef, which beging at Jaragua, skirts the whole of this bay, extending 2 miles offshore. South of Mangle Point are Yaminiguey and Cañete Anchorages, which are entered through two breaks in the reef, for which the best guide will be the plan, but they are fit only for small craft. At night or in hazy weather, it is necessary to be cautious in passing this reef. From Mangle Point the coast runs WNW. for 7 miles to the River Moa, and is skirted by a reef at the distance of 1½ to 2 miles.

The River Moa, one of the largest in Cuba, has a fall of more than 300 feet a short distance from the mouth. The entrance is shallow and only 30 yards wide, but the river deepens inside. About 12 miles inland are some mountains called the Sierras de Moa, which are good landmarks. From the mouth of the river to Yaguasey Point, 1½ miles to the westward, the coast is low and formed by sandy beaches alternating with mangrove swamps, through which the creeks or esteros of Fabrica and Yaguasey empty. From Yaguasey Point, which is low, the coast, also low and covered with mangroves, trends WSW. for 1½ miles to the mouth of the Estero de Moa, where there are three or four fishermen's huts, the remains of a former settlement.

From the Estero de Moa, the coast trends NW. ½ W. for 2 miles to Cabañas or Cavagan Point; is low and sandy, with a few rocky bluffs, and ¾ mile from Estero de Moa is a spot where good water may be obtained.

The bay between Yaguasey and Cabañas Points is called the Cayo Moa Bay.

Cayos de Moa are two islets lying just inside the reef, one mile westward of the opening. The larger one of the two is 1½ miles long, from ¼ to ⅛ mile wide, of rectangular shape, and has a projecting point at its SE. angle. The smaller cay lies NW. of the larger, from which it is separated by a narrow creek, is ¼ mile in diameter, and both cays are low and covered with mangroves.

Port Cayo Moa is protected on its northern side by the Cayos de Moa.

The anchorage is about one mile long and ½ mile wide, and is approached through an opening called the Quebrado de Moa, about 600 yards wide in its narrowest part.

Shoals.—Just within the opening in the reef and on a line between it and the mouth of the River Moa is a bank of sand and rock called the Bajo Grande, about ¼ mile in diameter. In some places on this shoal there are less than 2 fathoms of water. One mile west of the Bajo Grande and ½ mile south of Cayo Grande de Moa is another shoal, of small extent, called the Yaguasey Shoal, the least water on which is 9 feet. Another small shoal spot, ¼ mile farther to the northward, called Palanca Shoal, is generally marked by a stake.

The eastern or weather reef at the entrance to this anchorage is distinctly marked, even in fine weather, by broken water, and the rocks are rather above water than awash. But on the lee or western side of entrance there is nothing to mark the danger for at least ⅔ of a mile from the eastern reef. The general body of the shoal extending from Cayo Moa, is coral covered with dark weed, which, even with 9 feet of water over it, looks deep; but the SE. end of it is white sand and the bottom can be seen. In standing for this anchorage bring the mouth of the River Moa to bear S. 11° W. (S. 9° W. mag.), on which bearing the opening in the reef will present a fair channel way and the eastern side

of the reef be easily distinguished. Or, coast along the weather reef from the eastward, keeping off about 100 yards, or less, if necessary, as 7 to 9 fathoms will be found 30 yards off.

Directions.—The course through the opening is S. 11° W. (S. 9° W. mag.), keeping near the weather side. As soon as the SE. point of Cayo Moa, called Pajaros Point, bears N. 82° W. (N. 84° W. mag.), steer S. 70° W. (S. 68° W. mag.), leaving the Bajo Grande on the port hand, till the mouth of the River Moa bears S. 20° E. (S. 22° E. mag.), then haul up a little more to the westward and anchor in from 11 to 12 fathoms, muddy bottom, with Pajaros Point bearing about N. 28° W. (N. 30° W. mag.), ½ mile distant.

Tides.—It is high water, full and change, at about 7h. 0m., and the rise is about 3 feet. The flood stream at the eastern end of Cayo Moa Reef sets to the SW. a mile an hour, and the ebb to the northward.

Port Yaguaneque.—From Port Moa the shore trends westward 10 miles to Yaguaneque, and the reef between extends off for 2 to 3 miles. About 6 miles to leeward of Moa, a mile within the edge of the reef, is Burro Cay, and 3 miles farther on, about ¼ mile from the shore, is Arena or Sand Cay. The entrance to the port is through a small opening in the reef ⅔ mile to the SW. of the latter cay; but being so narrow and intricate, and the interior merely a shallow lagoon, it is only fit for small coasters.

Cananova, 1½ miles westward of Yaguaneque, is a small narrow inlet of similar character, and is entered through an intricate opening in the reef north of it, which is here only ½ mile from the shore.

Port Cebollas, 4 miles farther westward, is equally difficult of access, and only fit for coasters. The shore is low and sandy, and the reef about ½ mile distant.

Port Tanamo.—From Cebollas the low sandy shore continues westward 9 miles to Port Tanamo, and is again foul to the distance of a mile. Midway between is the mouth of the River Sagua. This port is of considerable extent, and studded with small islets, between which are deep channels. The cut through the reef and the channel into the port are both very narrow, but the dangers are easily seen, and the eye will be the best guide.

Ports Cabonico and Livisa.—From Tanamo a low sandy shore, still bordered by a reef to the distance of about 2 miles, trends westerly for 9 miles to the entrance of the ports of Cabonico and Livisa. These ports are entered through a narrow deep channel about 200 yards wide. About ½ mile within the entrance a narrow neck of land divides the interior into two channels; the easternmost leading into Cabonico, the other into Livisa. Both are very tortuous and intricate, but have sufficient water for vessels of large draft. Most of the dangers are seen, and the eye will guide in mid channel.

Port Nipe.—From the entrance to Cabonico the coast trends WNW. 5 miles to Port Nipe. In this space the reef skirts the shore at about

a mile until close to the entrance to Nipe, where it extends off only ¼ mile. Port Nipe is about 9 miles in extent east and west, and from 3 to 7 miles in breadth. It is quite secure against all winds, and will admit vessels of the largest draft without difficulty. The entrance is from ¼ to ¾ mile wide, and all that is necessary in entering is to steer in mid-channel; the tides run very strong in the narrows. After passing the inner points of the entrance, keep the northern shore aboard until within Mangle Point, from which a shoal extends to the NNE. ¾ mile, when anchor as most convenient, in 6 to 9 fathoms water; the edges of the shoals are marked by stakes.

A sailing vessel will have to wait for the land wind to take her out, which, as before stated, in the winter season is frequently interrupted by Northers for some days.

Mount Sama.—The land in this neighborhood is remarkable. About 10 miles inland the Cristal Range, a continuation of the Baracoa Chain, rises to a great height. To the NW. of Port Nipe there is also a lofty ridge of mountains rising from the shore at Mulas Point to the Pan de Sama, a hill of rounded form, 918 feet above the sea, with some long table-land close to the westward, and a peaked hill to the east of it; it can not well be mistaken, and may be seen 20 miles. The two ranges are separated by an extensive valley, which also serves as a good guide.

Port Banes.—From the entrance to Nipe a bold and steep coast trends to the NNW. and NW. for 9 miles to this harbor, which is also well sheltered, and of sufficient depth for large vessels. Its entrance, however, lies at the bottom of a bay or funnel 2 miles wide in the outward part, and completely exposed to the usual trade wind. The channel into the port narrows to 300 yards, and the turnings are so sharp that it is a very difficult pilotage. In leaving, make sure of a good offing before the heavy wind fails, as the vessel will be on a dangerous lee shore and exposed to a heavy sea and lee current.

Lucrecia Point.—From Canones Point the shore runs in a NNE. direction 6 miles to Point Mulas, and is foul nearly a mile off. Thence it trends NNW. 4 miles to Manglito Point, and then about NW. for 2 miles to the east point of Larga Beach, on which stands Lucrecia lighthouse. The point of this latter name is about ½ mile westward, and the land here rises by degrees from the sea to a height of about 200 feet a mile inland. From abreast Manglito Point a reef skirts the shore for 1½ miles westward at a distance of 200 yards. From the lighthouse the shore trends nearly west for 1¼ miles to Gorda Point, forming various points a little salient; this part of the coast is called Larga Beach, and it is bordered by a reef which extends northward ¼ mile. Between Manglito and Gorda points the shore is low and mostly of soboruco, with some parts covered with sand. A short distance from the sea mangroves and trees are seen, and the coast appears somewhat higher than it really is.

Light.—The tower near Lucrecia Point exhibits at 132 feet above the sea a flashing red light; duration of flash, 2 seconds. The light should be visible 18 miles.

Port Sama.—From Gorda Point the coast trends about NW. by W. 6 miles to Sama Point, which is 3½ miles eastward of the port of the same name. All this part of the shore is clean and steep-to, and about midway is the small River Seco at the head of a sandy bay. Port Sama is a small inlet about 1½ miles long, north and south, from 200 to 400 yards wide, and only fit for vessels drawing not more than 11 feet water. The entrance may be readily found by the Pan de Sama, which rises south of it. To the westward of the port there is also the table land or flat-topped ridge of mountains running NW. and SE., and its west end is bold, scarped, and of a whitish appearance.

Port Naranjo.—Between Sama and Naranjo, 5 miles westward, the shore is composed of sand and named Guarda-la-vaca. To the southward of it there is a detached sugar-loaf hill, and to the SW. the table of Naranjo, a small wooded mountain with a flat summit. Naranjo lies between these two objects, and about 3 miles to windward of it there is a remarkable red cliff, and on the east side of the entrance there is also another of the same appearance, high and scarped. The shore between it and Sama is foul to the distance of about ½ mile. The entrance to the port is only 200 yards wide, but it opens out into an irregular-shaped basin containing several inlets deep enough for vessels of all classes, sheltered from all winds, and they can sail in or out of it with the usual sea breeze.

In entering this port a berth should be given to the reef skirting the weather coast until the eastern point of entrance bears S. 3° E. (S. 5° E. mag.), then steer in, giving the point a berth of 200 yards to avoid the shallow sandbank which surrounds it at a distance of 150 yards. Care should also be taken to guard against the sandbank bordering the lee side of entrance, and which extends northward 350 yards from the outer scarped point. Having passed through the middle of the channel by the eye, anchor about 150 yards off a marshy and mangrove shore on the eastern side, in 9 fathoms water; or proceed farther up into what the fisherman call the Carénage or western bight. The best berth here will be in about 8 fathoms, with the center of the table of Naranjo S. 69° W. (S. 67° W. mag.), and the north point of the Carénage in one with the red cliff at the entrance about north. The table of Naranjo from this quarter has a conical appearance.

Wood and Water.—There is good wooding and watering; the latter a stream on the southern shore at the head of the Carénage, abreast the table of Naranjo; but there will be some difficulty in finding the opening in the bushes leading to it.

Tide.—The rise of tide at Port Naranjo is 3½ feet.

Port Vita.—From the entrance to Port Naranjo the shore trends WNW. 2 miles to Pesquero Nuevo point, which is scarped and clear

of danger, and then SW. 3 miles to Port Vita. This part of the coast is low, sandy, clean and steep-to. Vita is a small, narrow, irregular-shaped inlet, which may be used and easily piloted by vessels drawing under 18 feet.

Port Bariay.—Three miles westward of Vita is Bariay, and a mile farther Jururu; the shore between is clear of danger. Port Bariay is open to the northward, and therefore not safe in the winter months; but there is good temporary anchorage close under the weather shore off the second sandy beach from the entrance. Farther in the channel is obstructed by a shoal, on which there is as little as 6 feet of water.

Port Jururu is more extensive than that of Bariay, and the interior completely sheltered, with a depth of 4 fathoms; but the entrance is narrow, rather tortuous, and only fit for small fore-and-aft rigged vessels of light draft.

Gibara is merely a small bay open to the northward, having a depth of 3¼ fathoms just inside the points of the entrance.

Three small hills to the southward of the port, and which from the offing resemble islands, serve as landmarks for this vicinity. The easternmost of these is called the Saddle of Gibara, the middle one is shaped like a sugar-loaf, and the westernmost is called Mount Candelaria. The town is on the west side of the bay, and can be seen at a distance of 9 miles.

To enter the harbor it is only necessary to bring the entrance well open and steer in half way between the points of entrance.

There is said to be a bank near the middle of the bay called the Casco de San Vicente, but no definite information can be given as to its exact location or depth of water. It may, however, be avoided by keeping the eastern shore aboard. Although there is no shelter from northerly winds and the harbor is only fit for small vessels, it is the port of Holguin, a large town about 15 miles inland in a highly productive part of the country.

The River Gibara, navigable for a short distance by boats, empties into the head of the bay. Coast pilots for the north coast of Cuba and the Old Bahama Channel may be obtained here.

The United States is represented by a consular agent.

The Coast from the western point of Gibara Bay takes a northerly direction for 2 miles to Brava Point and is bold and rocky. It then bends round about NW. for 7 miles to Gorda Point, and 5½ miles farther is Mangle Point. The shore is rocky, sloping, and clean to Mangle Point, but it then becomes sandy and steep-to as far as the eastern point of Herradura Bay, 7 miles to the WNW., where coasters drawing 10 feet find anchorage, but it is open to the northward. Thence it takes a more westerly direction for 7 miles to Port Padre. This latter part is low and foul to some distance; on the shore are many remarkable palm trees.

Port Padre is a secure and capacious basin, with a depth of at least 4 fathoms in the greater part of it. The western side of this bay is steep-to. To enter the port it is only necessary to keep well off the reef which terminates off Point Jarro and, when this point bears about south 45° east (S. 47° E. mag.), stand into the bay, keeping near the western shore. Steer in mid-channel; with the aid of the chart no difficulty will be found, as there are no hidden dangers. There is a village on the western side of the entrance.

The harbor is nearly divided in two parts. The easternmost anchorage will be found the most convenient for leaving with a sailing vessel. The channel leading to it is between the two islands just inside the entrance.

The shores of the harbor are low and swampy.

Five perches mark the channel into the western branch of Port Padre after passing Point Gracia, one on the NW. end of Cay Puercos, one off the NW. end of Cay Juan Claro—these are to be left on the port hand—and three on the shoal between Puerco Cove and Morena Point, to be left on the starboard hand. There is also a beacon surmounted by a ball, and painted green and white, on a shoal named Esteron in the harbor.

Malagueta.—The shore from Port Padre continues its westerly direction for 5 miles to Piedra Point, where there is a small opening leading into Malagueta Inlet, an extensive unnavigable lagoon. The land around is low and swampy. Thence the coast takes a NNW. direction 3½ miles to Cobarrubias Point and then WNW. 7 miles to Port Manati. All this coast is skirted by a reef to the distance of about 2 miles.

Port Manati has a depth of 4½ to 5½ fathoms. It is merely a long, narrow, crooked channel, bordered by shoal banks on both sides and leading into a shallow lagoon surrounded by low, marshy land. The place is only fit for small coasters. On its western side is a conical hill called El Mañueco, and a little beyond it another, not quite so high, called the Pardo or Mesa de Manati. These elevations may be seen 15 or 20 miles and are good guides for the offing; when seen nearly in a line they resemble the Saddle of Gibara, and if mistaken for it the error might lead to accidents. All this part of the shore is foul, the reef extending off about ⅔ mile from the entrance of the inlet, through which a channel is formed leading to the port.

Port Nuevas Grandes.—From Manati the coast trends about NW. 2 miles to Braba Point, and then NW. by W. 4½ miles to the entrance of Nuevas Grandes, which is merely a small tortuous inlet, in some parts only 200 yards wide and only navigable for vessels under 12 feet draft. All this part of the shore is foul, and the reef extends off about ⅔ mile from the entrance of the inlet, through which a channel is formed leading to the port.

Port Nuevitas del Principe.—From Nuevas Grandes the coast takes a NW. direction for 13 miles to Nuevitas del Principe, is skirted by a reef all the way, and should not be approached within 2½ miles.

Nuevitas is the port of Puerto Principe, about 45 miles distant, the two places being connected by a railway. The land is low on both sides of entrance; the town is surrounded by hills from east to SW.; back of the town the land is low. The entrance of the harbor may be recognized by the Maternillos lighthouse, by three small hills on the south side of the harbor, and by three islets in the harbor called Los Ballenatos, a little higher than the surrounding land. Also on the east side of the entrance is a quadrangular building, painted yellow, surmounted by a white mast, from which is shown a light.

The harbor is large, completely sheltered, and capable of admitting vessels of the largest draft. The entrance is through a crooked, narrow channel nearly 6 miles long. Middle Shoal is in the center of the channel, so that the assistance of a pilot is desirable, although there are no hidden dangers. The outer points of the entrance are low and about ½ mile apart. In entering without a pilot the eye and chart are the best guides. Care must be taken to avoid a dry sand spit near the end of the eastern reef, and bearing N. 56° E. (N. 54° E. mag.) one mile from the flagstaff on the point. The harbor in front of the town is shoaling and vessels drawing 14 feet should not come inside of Guanjay Point.

If it is only desired to communicate with the town, anchorage will be found off the fort about 1¼ miles within the entrance. The town of San Fernando de Nuevitas is 14 miles from the entrance, on the point of a peninsula which separates the southern part of the harbor from Marinavo Bay; it does not come in sight until Guanjay Point is passed.

At the entrance of the port the tidal stream is said to have a strength of 3 miles an hour. Tide rises about 2½ feet.

The population is about 2,200. The health of the city is good, the sickly season being from April to September. Provisions are abundant. Rain water can be had from cisterns. River water not used. The bay is celebrated for its fish; they are abundant and in great variety.

Trade is mostly with the United States. Large numbers of cattle are shipped to Havana. The United States is represented by a consular agent.

Authorities to visit: Captain of the port.

Steamers.—Steamers cross either way to and from Havana every 5 days. Herreras West Indian Line, two steamers a month to Puerto Rico and three to Santiago de Cuba and return. Compañía Transatlantica, from Havana to Puerto Rico monthly, in combination with the steamers at San Juan for Spain.

Mails from the United States, via Tampa, to Havana twice a week in summer and three times in winter. They are quite regular. Six days to New York when connections are made.

Telegraph.—Telegrams can be sent to all points via Principe and Havana.

Pilots are spoken of as being intelligent and reliable. Two pilots reside in the houses near light at east entrance point and two pilots reside in town. Strangers should always take a pilot before going up to the town.

Light.—On Barlovento or Pilot Point, the east side of the entrance, is a quadrangular building painted yellow, and a white mast stands in the middle of it, from which is exhibited, 48 feet above the sea, a white light, visible 9 miles.

Maternillos Point is 4½ miles from the entrance to Port Nuevitas. The coast between is low, but free of danger. The point is surrounded by a coral reef called the Corona de Maternillos. From Maternillos Point as far westward as Icacos Point, a space of nearly 250 miles, the coast is bordered with low mangrove cays and reefs to the distance in some places of 20 miles from the mainland. The greater part to the westward of Paredon Point is but imperfectly represented on the charts, and, being studded with dangers, steep-to, should be most cautiously approached.

Light.—The lighthouse on Maternillos Point is 170 feet high, white, with the word Colon painted on it, and exhibits, 174 feet above the sea, a fixed and flashing white light every 48 seconds, duration of flash 5 seconds. The light should be visible 17 miles.

Cay Sabinal.—The shore is very low and sandy, backed by numerous lagoons and swamps, and skirted by a broken reef to the distance of from one to 1½ miles, with soundings about ⅓ mile outside of it.

Between this reef and the coast there are anchorages for vessels whose draft does not exceed 9 feet, such as Tortugilla, Cruces, and Caravelas, where there is shelter from the ordinary winds, but not from the northward. These anchorages are entered through the openings in the reef which are shown by the sea breaking, and a vessel may steer in by the lead and eye and anchor, when sheltered, as convenient.

The only remarkable object on this coast is a large clump of mangrove trees about 10 miles to the westward of Maternillos Point called the Alto de Juan Danue. Very near it is a small cay 30 feet high.

The Boca de Caravelas is a narrow opening between Cay Sabinal and Guajaba Island. There is a depth of one fathom on its bar, and about the same depth may be carried through a crooked channel between the mangrove cays as far as the town and river of Guanaja, 22 miles to the westward. This village is on the great bay of the same name, bounded by the coast of Cuba and the Cays of Guajaba and Romano.

At the entrance of the Boca de Caravelas the tide runs at the rate of 3 knots.

Guajaba Island.—From the Boca de Caravelas the NE. side of the island of Guajaba trends nearly NW. 10 miles. For the first 4 miles it is a low mangrove shore; the remainder is a sandy beach. It is skirted by reefs at a distance of nearly 2 miles, which continue to Cay Confites, forming various breaks which afford anchorages for small vessels of not

more than 7 feet draft. On this island are two small hills; the SE. hill is about a mile in extent, NW. and SE., and 90 feet high; the other is a smaller round lump, and a little less elevated. When first seen from the eastward they have the appearance of four small hummocks, and serve as guides to this part of the coast.

Boca Guajaba, which separates this island from Cay Romano, has a depth of 5 feet at its entrance at low water, the tide runs 2 knots an hour, and there is a boat channel with 3 feet water up to Guanaja.

Cay Romano is inside the chain of cays and reefs, and separated from the Cuban shore by a sort of shallow lagoon. It is mostly covered with a mangrove swamp and divided in two by a narrow inlet.

On the eastern end of Cay Romano is a remarkable hill. At the foot of this hill, called the Silla de Romano, on the beach, will be seen two fishing stations.

There is a smaller hill 16 miles to the NW., and only 100 feet high, called the Alto de Aji. Another similar hill, near the NW. extremity of the cay, is called Juan Saez.

The bottom between Cay Romano and the Cuban shore is of olive-colored mud covered with weeds.

Cay Verde is a small, low islet, of a circular form, and 200 yards in diameter, covered with bushes to the height of 10 feet above high water, and inside the reef, N. by E. of the Cay Guajaba, there is an opening through which 10 feet of water may be carried, and ½ mile SW. of Cay Verde there is shelter for vessels of this draft against Northers. The best channel to take is that round the north end of the reef, about 1½ miles from the cay; but it requires good local knowledge of the place to enable a vessel to thread her way safely through the shoals.

Cay Confites is a low cay, and lies close on the edge of soundings. On its south end there is a pile of stones, and near the north end a solitary tree, which is the first object seen when coming from the SE. Off the north end a dry reef extends to the distance of one mile, leaving a small channel 12 feet deep between it and the cay. A dry reef also extends from the south end.

Between this latter dry reef and the reef running off to the northward of Cay Verde there is a clear channel carrying a depth of 5 fathoms, and leading into anchorage under Cay Confites in from 2 to 4 fathoms of white sand. The best sheltered berth is with the cay bearing N. 45° E. (N. 43° E. mag.) about a mile off, or nearer, according to the vessel's draft. It should be observed, however, that with the wind to the southward of east a heavy roll of the sea sets in round the south end of the cay. This is the only anchorage on this side of the Bahama Channel, between Nuevitas and Paredon Grande Cay, where a vessel drawing more than 12 feet can ride out a Norther in safety.

In passing through the channel between Cay Verde and Cay Confites keep a little closer to the latter than the former. When the middle of Cay Confites bears N. 38° W. (N. 40° W. mag.) and Cay Verde S. 11°

W. (S. 9° W. mag.) a vessel will be on the edge of the bank of soundings, or nearly so. Then steer N. 68° W. (N. 70° W. mag.) till the south end of Cay Confites bears north (N. 2° W. mag.); thence the course is about N. 30° W. (N. 32° W. mag.) till the southern end of Cay Confites bears N. 45° E. (N. 43° E. mag.), where the anchor may be let go in 3 to 4 fathoms of water; sandy bottom.

In quitting this anchorage, if the wind does not permit a vessel to leave by the SE. channel, steer to the NW. until clear of the reef extending from the north end of the cay.

Cay Cruz is about 11½ miles long, in a NW. and SE. direction, very low and flat, with a sandy shore, and at its NE. point there is a remarkable clump of trees, 30 feet high. A mile WNW. of the clump of trees is a sand bank, which is only seen when near it. The cay is divided in the center by a small cut, and abreast it on Cay Romano there is the remarkable hummock called the Alto de Aji. Between these two cays there is only a foot of water at low tides, and the bottom is like pipe clay.

Tributarios de Minerva Reef.—About ½ mile within the edge of soundings, 2 miles north of the north end of Cay Cruz, lie the Tributarios de Minerva, a reef on which the sea breaks with fresh breezes, and which uncovers at low tide. In a WNW. direction from this reef are numerous others, with but little water on them, and near the edge of soundings. The edge of the bank between Cay Confites and the Tributarios de Minerva runs NW. in a straight line for 14½ miles, and may be seen from aloft, the white sandy bottom showing itself distinctly just within the edge of the bank, which is very steep-to. This part is extremely dangerous, and should be approached very cautiously, as there is no safe anchorage whatever.

Caiman and Anton Cays.—About 4 miles NW. of Cay Cruz lies Caiman Cay, higher than others in the vicinity; and about 3 miles farther, at Sandy Cay, begins a chain which extends in a NW. by W. direction for 9 miles to Anton Cay, and thence to Paredon Grande Cay, all skirted by shallow banks without anything particular to recognize.

Paredon Grande Cay.—The space between Caiman and Paredon Grande Cays is interrupted by low cays, sand banks, and reefs. From the Tributarios de Minerva the edge of the bank takes about a NW. by W. direction for 18 miles, when it comes within 2 miles of the north end of Paredon Grande Cay, which is about 5 miles in length east and west, rocky, woody, and about 40 feet high. Guinchos (or Ginger) Cay, on the edge of the Bahama Bank, bears from the north point of Paredon Grande N. 8° E. (N. 6° E. mag.) 16 miles.

Light.—On the northern part of this cay is an iron structure, white with a brown base, on a foundation of rock, from which is exhibited a fixed and flashing light, flash every minute, 156 feet above the sea, and visible about 19 miles.

Paredon del Medio.—To the NW. of Paredon Grande and close to it is Paredon Chica, a round cay of regular height; and 2¼ miles west of the latter is another similar cay, 25 feet high, named Paredon del Medio. These cays afford shelter with the wind from NE. to east for vessels of 9 feet draft, but with the wind from NNE. it is necessary to leave the anchorage in consequence of the heavy sea which sets in. The Paredon del Medio is foul on the north and east, and a vessel can not pass inside it. About half-way between the two Paredons lies a bank on which the sea generally breaks.

Between Cay Confites and Paredon Grande there is no anchorage, as throughout the space is full of shoals not sufficiently large to afford shelter. The bank should not be approached closely without purpose.

Water.—The only good water to be obtained at any of these cays is from a few springs or wells. In some places by digging in the sand it may be found, but is generally brackish.

Tides —The stream of tide sets right on and off the bank about half a knot an hour, but in the openings between the cays it runs from 2 to 3 knots. It is high water, full and change, at 7h. 30m., and the rise at springs is 3 feet. Between the cays and the main the rise is not more than a foot, and the stream is scarcely perceptible.

Cay Coco.—Five miles SW. by W. of Paredon del Medio is the northwestern part of Cay Romano, separated from Cay Coco by a channel ½ mile wide and nearly 4 feet deep. Cay Coco is of moderate height, with various sandy places on the northern part, and the southern part extends westward covered with mangroves to southward of Guillermo Cay. At the northern part of Cay Coco is the port of the same name, sheltered with northeasterly winds, formed by Jaula Cay, and a small reef which unites it to Cay Coco. This anchorage is exposed to northerly winds. Three-quarters of a mile northward of the east end of Cay Coco is Queche, a small flat cay covered with mangroves. Westward of Paredon del Medio, shoals extend almost continuously to the NE. part of Cay Coco.

Jaula, Guillermo, and San Felipe Cays.—Four miles westward of Coco Point is Jaula Cay. WNW. of Jaula there are three other small cays name San Felipe, the smallest distant 4, the next 6, and the most western 7 miles. Guillermo Cay lies W. 6 miles from Jaula Cay, and extends 5½ miles ESE. and WNW.; its western part is of moderate height.

Media Luna Cay is flat and bordered with reefs on its southern and western sides. N. 79° W. (N. 81° W. mag.) of the cay, and lying on the edge of the bank of soundings, are two shoals. South of these shoals and of San Felipe, Media Luna, and Santa Maria Cays, there is a channel from Point Coco to the anchorage of Cay Frances for vessels drawing not more than 9 feet.

South of Guillermo Cay, and extending from the west end of Cay Coco, is a group of 13 cays laid down on the charts, the names of which

are not given. From Cay Coco they curve around to the south and west, the curve being open to the eastward.

The Hijos Guillermo are three cays of small extent, surrounded by a reef, and lying 1½ miles WNW. from Guillermo Cay.

Santa Maria Cays.—About WNW. of Media Luna Cay is the chain of small cays of Santa Maria, the eastern of which is 8 and the western 14 miles from it.

Close westward of this last group is Caiman Cay, SW. of which again is Santa Maria Cay, which is of regular height, and extends 6 miles east and west.

From Paredon Grande, the edge of the bank takes about a WNW. direction for 50 miles, and is then about 4 miles northward of Santa Maria Cay. This part of the coast is very little known; it is dangerous, and affords no anchorage whatever to any but small coasters, that are well acquainted with it. The bank next trends WSW. 10 miles, its edge continuing nearly the same distance from the outer cays.

Cay Frances.—About 7½ miles S. 82° W. (S. 79° W. mag.) of Santa Maria Cay is the east end of Cay Frances, which is of regular height and 3 miles in extent. On its north side are seen, extending east and west, three round hills, two joined together, and the third somewhat separated, which are called the nipples of Viuda. The paps of Buena Vista and Mount Guajabana will also be observed; the former bears about S. 37° W. (S. 34° W. mag.) from the west end of the cay, and the latter S. 49° W. (S. 46° W. mag.). On the west point of the cay, which is low and rocky, are several pilot houses. The point is surrounded by a sand bank which extends westward, and to the SW. for nearly a mile; a mile westward of the point the depth is 5 fathoms; a red buoy (not to be depended upon) is placed in 6 feet water, about 300 yards within the southern edge of this bank.

Light.—On the western end of Cay Frances is a lighthouse, from a mast at the NW. end of which, at an elevation of 60 feet, is exhibited a fixed white light visible 15 miles.

Cay Frances Anchorage is, however, only a narrow vein of deeper water about ½ mile wide and running east and west. In standing in keep the paps of Buena Vista well open to the westward of Herradura Cays and Cobos Cay till the SW. end of Cay Frances bears S. 67° E. (S. 70° E. mag.) Then haul round the sand bank and anchor with the flagstaff bearing north and a small white cliff on the west side of the cay bearing N. 79° E. (N. 76° E. mag.).

In beating in for the anchorage do not stand to the northward into less than 3½ fathoms, as the bank is steep-to. To the southward, toward Cobos Cay, a vessel may safely go into 3 fathoms. Around Cay Frances there is an abundance of excellent oysters.

Water.—There are some good wells at the south end of Cobos Cay and water will be found at Coco Bay.

Caibarien, on the mainland about 15 miles from Cay Frances, is the port of San Juan de los Remedios, about 5 miles in the interior, the communication being by railroad. The channel to this port lies between Boca Chica, a small flat cay 4 miles S. 56° W. (S. 53° W. mag.) of the western part of Cay Frances, and the west end of Cobos Cay. Vessels drawing under 9 feet can anchor off the town Caibarien, but those of heavier draft load at Cay Frances. The city contains about 4,000 inhabitants and San Juan de los Remedios about 13,000.

Pilotage is compulsory, except to vessels under 50 tons register and coasters which have a regular pilot on board; the rates are as follows: up to 100 tons, $10; 101 to 200 tons, $15; 201 to 300 tons $20; 301 to 400 tons, $23; 401 to 500 tons, $25; 501 to 600 tons, $27; 601 to 700 tons, $29; 701 to 800 tons $31; 801 to 1,000 tons, $34; 1,001 to 2,000 tons, $37; 2,000 tons and upwards, $40.

For moving vessels at anchorage inside of Cay Frances up to 20 feet draft, one-third pilotage will be paid. For moving vessels from Cay Frances up to the bay, half pilotage will be paid. For moving vessels to any other anchorage inside of Cay Frances two-thirds pilotage will be paid. Vessels calling at Cay Frances for orders that do not load here will pay one-quarter pilotage. Vessels in distress and men-of-war pay regular pilotage.

There are no light or tonnage dues.

Weather Signals.—The following signals are shown from the port office flagstaff.

A red triangle indicates a probable storm; a blue and white flag horizontally striped, that the storm is approaching; a black ball shown with either of the above signals indicates that the weather is improving.

The Spanish ensign indicates the bad weather is past.

By night.—A white light shown from a flagstaff indicates approaching foul weather.

Fragoso Cay extends NW. 22 miles from Boca Chica at its east end, and presents nothing remarkable but a small hill in the middle, named Anton, which rises before the other land of the cay, which is low. The cay is divided by two narrow channels named Anton, but they are not navigable. On its NE. side is the Almedinas Reef, and another 2 miles NW. of the north point of the cay.

Almedinas Reef, which always breaks, lies close to the edge of the bank, 3 miles from Anton Hill. Between the reef and Fragoso Cay there is a channel with 2½ fathoms water.

From abreast Cay Frances the edge of the bank trends about NW. by W. for 40 miles, when it comes within a mile of the Jutias Cays; it then curves more westerly to the Boca of Marillanes.

Medio and Pajonal Cays.—About 2 miles WNW. of the west end of Fragoso Cay lies a low cay named Medio; and NW. of it are the Pajonal Cays. Between this group and Medio is the Boca de Marcos, navigable only for vessels under 5 feet draft. The Pajonal Cays extend

about NW. for 4 miles to Tocinera Point, the north extreme of the group.

Vela and Carenero Cays.—Three miles NW. of Tocinera Point lies a small, flat cay called Vela; about 2 miles to the southward of it is Carenero divided in two, and a mile westward of the latter is Lanzanillo, with a channel between.

The Boca de Lanzanillo, between the cay of the same name and Carenero Cay, is ½ mile wide and 1¾ fathoms deep, and leads to Lanzanillo Anchorage, of which Lieut. Don Rafael de Aragon, commanding the Spanish steamship Don Juan de Austria, gives the following description:

This anchorage is a commodious and secure harbor for vessels drawing less than 11 feet. It lies between Lanzanillo and Carenero Cays, and is completely land-locked by them and other cays adjacent, so as to be sheltered from all winds. It is clear of hidden dangers, and has a depth of 11 feet of water, with excellent muddy holding ground. Lying between Caibarien and Sagua la Grande, its shelter may be reached when there is not time to reach either of these other ports. The channel leading to it, between Lanzanillo and Carenero cays, is bordered with reefs on either side and has also a hidden shoal in its center, dividing the channel in two, of which the leeward or western one is preferable, being the deeper. Although this channel is short it is somewhat difficult, as the reefs on the sides as well as the shoal in the center can seldom be seen. A beacon has therefore been planted in 9 feet of water at low tide on the most salient part of the reef on the western side of the lee or western channel.

In approaching this anchorage from the offing steer for a fisherman's hut of white color, and easily seen, situated on the beach of Lanzanillo Cay. Leave Vela Cay on the port hand, skirting the bank extending off its western end. When the channel is well open the beacon will be seen, and should be passed close-to, leaving it on the starboard hand. In this way the shoal in the center of the channel will be avoided.

After passing the beacon, Carenero Cay and Reef should be carefully rounded, anchoring under their shelter as convenient in 11 feet of water; muddy bottom.

Jutias Cays are a group of several islets of moderate height, about 3 miles W. by N. of Vela Cay, and extend 4 miles westward. From the largest of them, three small rather flat cays lie in a NE. direction over a space of 1¾ miles, and from the outer one a broken reef extends westward 4 miles.

Boca del Seron is one of the channels leading to the mouth of the river Sagua la Grande, and which admits vessels of about 8 feet draft, but a pilot is necessary. About a mile NNE. of the entrance is a bank on which the sea always breaks.

Bocas Canete and Marillanes.—About ¾ mile NW. of the Boca del Seron is that of Cañete, which admits vessels under 5 feet draft. Two miles farther on is the Boca Marillanes, which carries nearly 15 feet water, and is much frequented.

Fradera Rock.—This rock, about 100 yards in extent, with a least depth of 11 feet over it at low water, and having 22 feet close around,

lies with Cristo Little Cay bearing N. 70° W. (N. 73° W. mag.), east point of La Cruz Cay S. 4° W. (S. 1° W. mag.), and Marillanes Bank buoy S. 59° E. (S. 62° E. mag.); it is marked by a wooden beacon painted red.

Harbor of Sagua la Grande.—About 2 miles NW. of the entrance to the Boca Marillanes lies Cristo Cay, with the Boca de la Cristo midway between; and 6 miles WNW. of the north point of this cay is the entrance to the Boca Sagua la Grande. This port is considered to extend 13 miles WNW. and ESE., and 6 miles north and south. Of the several channels leading to the anchorage for loading, the only practicable one for vessels of over 8 feet draft is the Boca Marillanes.

As the cays which surround the port are low, and the greater portion of them composed of mangroves, the winds cause much sea notwithstanding the little depth. It is necessary in bad weather, and particularly in the months of September and October, to take every precaution for security. There are many beacons (piles) laid out on the projecting points and shoals, but they cannot be relied on.

The mouth of the River Sagua la Grande lies about 4 miles SSW. of the entrance to the Boca Marillanes, and is connected with the interior by a railway. The bar is passable for vessels of 6 feet draft. The town stands about 12 miles in a direct line from the coast, but 21 miles by the windings of the river.

Town.—The population is 18,100. There is communication with the harbor by river boats and a railroad. Vessels quarantined are sent between Cay Palomo and Cay Bamba.

There are six tugboats in the harbor.

The United States is represented by a commercial and vice-commercial agent.

Coal can be obtained.

Pilotage is compulsory except to vessels drawing less than 11 feet or measuring less than 250 tons (total tonnage). Between sunset and one hour before sunrise double pilotage is exacted. Vessels calling for orders, if they remain less than a week, will pay half pilotage.

Total capacity.	By Marillanes.	By Boca de Sagua.	Moving to or from wharf.	Leaving wharf, or changes made in bay.	Changes made at same wharf.
60 to 150 tons	$8.00	$10.00	$3.35	$2.00	$1.35
150 to 200 tons	10.00	12.00	4.15	2.50	1.70
200 to 300 tons	13.00	15.00	4.45	3.25	2.20
300 to 400 tons	17.00	19.00	7.10	4.25	2.85
400 to 500 tons	21.00	23.00	8.75	5.25	3.50
500 to 600 tons	23.00	25.00	10.00	5.75	3.85
600 to 700 tons	25.00	27.00	10.45	6.25	4.15
700 to 800 tons	29.00	31.00	12.10	7.25	4.85
800 to 1,000 tons	33.00	35.00	13.75	8.25	5.50
1,000 to 1,300 tons	36.00	38.00	15.00	9.00	6.00
1,300 to 1,600 tons	39.00	41.00	16.25	9.75	6.50
1,600 to 2,000 tons	41.00	43.00	17.10	10.05	6.85
2,000 to 2,500 tons	43.00	45.00	17.95	10.75	7.15
2,500 tons and upwards	45.00	47.00	18.80	11.25	7.50

Dues.—No tonnage or light dues. Health visit, $4. Inspection visit, $4. Extending protest, $5. Certificate to protest, $3.50. Translation of manifest, 1 to 25 lines, $2.50; 26 to 50 lines, $5; 51 to 200 lines, $10.

Directions for the Boca de Marillanes.—Vessels bound to Sagua la Grande through this channel should make Cristo Cay, on the east end of which are some huts, with a flagstaff bearing a blue flag with the letter, P, in white, marking it the pilot station. When about a mile N. 48° E. (N. 45° E. mag.) of the flagstaff, steer S. 20° E. (S. 23° E. mag.) passing eastward of Fradera Rock with beacon and westward of the iron buoy on the west edge of the Marillanes Bank. The buoy is in 19 feet water, and there is as little as 6 feet water on the bank, the sea generally breaking on it. On nearing the bar, a buoy, in 17 feet water, marking the western sand banks, will be seen, and which should be left to the westward.

When abreast this latter buoy alter course to S. 31° W. (S. 28° W. mag.), which, skirting the weather reef, leads in mid-channel between the Mariposa and Cruz Cays, leaving a beacon on the shoals between Palomo Cays and Cay Cruz on the starboard hand; then haul up and pass close westward of the buoy placed near the edge of the spit extending from Mariposa Cay; when a S. 10° W. (S. 7° W. mag.) course may be steered, passing the next, a bell buoy, on the port hand; anchorage may now be taken up in about 2½ fathoms water.

Leaving by this passage a vessel should take the advantage of the land wind, which blows regularly from daylight until 10 a. m., when the sea breeze sets in; the channel is too narrow for working. In case of calm or not sufficient wind, it will be necessary to anchor, the tide not setting fairly through the channels.

Boca Sagua la Grande affords a passage only for vessels of 8 feet draft, although at the entrance there are between 4 and 5 fathoms water, shoaling within. There is good anchorage in 3 fathoms about ½ mile southward of Muertos Point.

Light.—On the NW. point of Hicacal Cay, a fixed white light is shown from a mast above the keeper's dwelling, 55 feet above the sea, and visible 12 miles. The keeper's dwelling may be known by its red doors and windows; eastward of it there are a few fishermen's huts.

Cay Verde.—From Bushy Cay, the western point of entrance to the Boca Sagua la Grande, a chain of rocks, on which the sea breaks, encircles the cays as far as Cay Verde, 8½ miles to the WNW. Near the edge of the bank, and ½ mile north of Cay Verde, is a reef having an opening between it and another reef a mile farther westward, affording a passage for small vessels.

Médano Islet.—NW. by W. 6 miles from Cay Verde is a small, flat, sandy cay, from which the Nicolao Reef sweeps round from NE. to NW., distant from one to 3 miles, and on which the sea does not always break. About a mile SW. of it is a shoal which uncovers at low tide, and the sea always breaks over it. This part of the coast bank is extremely

dangerous, and not well known. From Médano Islet, Cay Sal bears N. 7° W. (N. 10° W. mag.) 28 miles.

The northern edge of Nicolao Reef bears about N. 60° E. (N. 57° E. mag.) from Bahia De Cadiz lighthouse, or farther north than shown on the charts.

To the eastward of Bahia de Cadiz Cay, between it and Nicolao Reef, there is a clear space on the bank with from 6 to 2½ fathoms water. Also, immediately eastward of the Médano, there is another clear space with about the same depth of water. A vessel under 10 feet draft may navigate over this part of the bank, with the lead and lookout for shallow water from aloft.

Mountains.—The following landmarks will be found useful in determining the ship's position: About 21 miles inland from the Nicolao Reef and the Médina Islet are the Sierras Morenas, extending NW. and SE. for a considerable distance and having several prominent peaks.

A little to the westward of the Sierras Morenas is a chain of mountains presenting three peaks called the La Bella Paps, the central one being the highest and bearing S. 23° W. (S. 20° W. mag.) of the Nicolao Reef. This peak bears directly south (S. 3° E. mag.) of Bahia de Cadiz Cay; consequently, when it is on that bearing a vessel will be to the westward of the Alcatraces and Nicolao reefs. S. 14° W. (S. 11° W. mag.), 6½ miles from Nicolao Reef, is the eastern extremity of the Alcatraces Cays, and 9 miles S. 42° W. (S. 39° W. mag.) of the Médano the western extremity. Between these cays and a chain named Falcones is the Boca de Alcatraces, where vessels of 9 feet draft will find shelter from all winds.

Bahia de Cadiz Cay is small and low, with some fishermen's huts and a flagstaff on its NE. point. To the westward is an anchorage sheltered from the usual NE. winds, but exposed to northerly winds. In hauling around the west end of the cay, vessels drawing not more than 15 feet may bring La Bella Paps to bear south (S. 3° E. mag.) or S. 6° E. (S. 9° E. mag.), and steer for them till the center of Bahia de Cadiz Cay bears N. 77° E. (N. 74° E. mag.), when the anchor may be let go in 4 fathoms of water; sandy bottom. Vessels drawing more than 15 feet should bring the same peaks to bear S. 17° E. (S. 20° E. mag.) till the center of the cay bears east (N. 87° E. mag.), then anchor in 5 fathoms. In standing in, the depths will be 4, 4½, and 5 fathoms, with a dark-colored bottom, it being sand covered with weeds.

Supplies.—Wood and fish are easily procurable, but there is no water to be had.

This part of the coast is little known, and inaccurately laid down on the charts.

Light.—Near the NE. end of Bahia de Cadiz Cay is an iron tower from which is shown, 175 feet above the sea, a fixed and flashing white light, showing a flash every minute, and should be visible 20 miles.

Tides.—It is high water, full and change, at Cadiz Cay, at 9h. 20m., and the rise 3 feet.

Cabezas Cay, 7 miles westward of Bahia de Cadiz, has a dangerous ledge running from it to the westward, and, as it lies on the edge of bank, it should be approached with great caution. About midway between this cay and Bahia de Cadiz is a shoal, on which the sea does not always break. From the Cabezas Cay the edge of the bank takes a W. ½ N. direction for 17 miles to the north end of Cruz del Padre Cay, which is the northernmost of the whole range. Thence the bank sweeps round to the SW., forming a convex to the westward, and terminates off the west part of Icacos Point.

Cruz del Padre and Galindo Cays.—Five miles WSW. of Cabezas Cay is the Pargo Channel, and 3 miles farther westward is that of Barcos, formed between the reefs; hence several cays continue to the WNW. as far as Galindo, on the north side of which are two small cays, Galindito and Muela. From Galindo, other cays continue to Cruz del Padre. About a mile N. 11° E. (N. 8° E. mag.) of Muela is a shoal near the edge of the bank; and a mile northward of Cruz del Padre Cay a chain of reefs commences and extends 6 miles westward.

Water.—On these cays, particularly at Cruz del Padre and Galindo, there are wells of good water.

Light.—On the reef about ¾ mile NE. of Cruz del Padre Cay is a conical white tower, from which is shown, 49 feet above the sea, a fixed white light visible 10 miles. This light is not to be depended on.

Blanco, Mono, Piedras, and Monito Cays, the westernmost of the cays and islets skirting the north coast of Cuba lie about a mile from the edge of the bank. About 5 miles SW. of Cruz del Padre is a group of low cays, extending NE. and SW., named Blanco. To the southward of them there is anchorage for vessels of 11 feet draft, with good shelter.

Mono Cay lies about 5 miles WNW. of the Blanco Group, and from it a shallow ledge runs off to the NE. a full ¼ mile; and a mile from the cay in the same direction there is a dangerous shoal (Palas Rock) of 1¾ fathoms water. Piedras Cay, composed of rock and sand, partly covered with low bushes and about 600 yards in extent, lies 2 miles SW. of the latter. Close off its NW. side are three rocks above water. A shoal of 16 feet water extends 550 yards NE. from the north point of this cay, and a coral patch of 15 feet is situated one mile from the same point and in the same direction; depths of 5½ fathoms were found between these shoals.

There is no discoloration of the water on this patch, but the sea breaks in heavy weather. There are from 5 to 8 fathoms water on either side of the shoal to within 600 yards of the cays. Monito Cay, 1½ miles from Piedras Cay, is a small black rock scarcely above the sea; a reef extends around it for about 400 yards. The channel between Piedras and Monito is clear. The soundings decrease as it is approached, and in the middle the depth is 6 fathoms. To sail through this channel a vessel should be able to lay up ESE. There is also a channel southward of Monito, but it is not recommended.

Light.—On Piedras Cay is an iron tower above a house, from which is shown, 75 feet above the sea, a fixed white light, varied by a red flash every two minutes, and visible 14 miles.

Anchorage.—There is good anchorage within the cays, in 6 fathoms water, sandy bottom, with Piedras Cay bearing west (S. 87° W. mag) and Mono Cay from north to NNW.; or in 4 fathoms, to the southward of Piedras Cay.

Tides.—It is high water, full and change, at Piedras Cay at 8h. 0m., and the rise is about 2½ feet.

Cardenas Bay is bounded on the north side by a very narrow strip of low, sandy, wooded land, which terminates to the eastward of Icacos Point; the entrance to this bay is so blocked up by small cays and shoals that it is only navigable for vessels of about 11 feet to the anchorages of Cardenas and Siguapa.

The best channel for entering this bay is that between Buba or Mangle Cay and Diana Cay. The bottom in the channel between Chalupa Cay and Diana Cay is very irregular, and in the center of the passage are some rocks, over which there is a depth of 8 feet. This channel is only frequented by small vessels. Even the most recent charts of this locality are not to be strictly depended upon. It is reported by the local authorities and captains of vessels visiting Cardenas that 15 feet can be carried into the anchorage off the city at high water. The reefs are said to be growing in ridges to the northward and eastward.

Two buoys are moored to mark the eastern and southern extremes of a sand bank stretching off Molas Point; these should be left to starboard on entering. The next three buoys mark dangers between Diana and Buba Cays, and they should be left to port on entering. Pass between the next two buoys to the southward, the eastern of which marks the southwestern extreme of the bank extending southwestward from Diana Cay, and leave the next three buoys on the port hand, entering from seaward, when, having passed the western one, a course may be steered direct for the anchorage off Cardenas.

The Town of Cardenas stands on the swampy shore at the SW. side of the bay, and is a place of considerable commerce, and communicates by means of a railroad with Havana and Matanzas. The town of Siguapa is westward of Cardenas, and they contain together from 23,000 to 25,000 inhabitants.

Sanitary condition is good, streets are well laid out, broad and clean. The city is lighted by gas and electric lights.

There are five machine shops where repairs to machinery and iron vessels can be made.

The authorities to visit are the mayor, alcalde, and captain of the port (naval officer).

The United States is represented by a commercial agent.

Supplies.—There is about 1,500 tons of coal on hand; cost $11 to $12 per ton, United States gold, and from $2.50 to $3 per day for Span-

ish laborers. The coaling is slow, about 40 tons per day. There is only a moderate supply of provisions on hand, and the prices are high. Water can be obtained from San Autin River.

Steamers.—One line small steamers inside the cays weekly to Caibarien, also a line from Havana every 10 days to Caibarien, stopping at Cardenas each way. The Ward line from New York call every three weeks.

There is telegraphic communication with all parts of the world. The government reserves the right to demand a translation of all messages.

Pilots are not necessary unless going up to the city, but pilotage is compulsory to all vessels except those under 80 tons. Vessels of from 80 to 100 tons pay $13. English vessels pay $1 more. No light or tonnage dues.

Light.—A fixed white light is exhibited from an iron column on the west side of Diana Cay, nearly a mile SE. of Mangle Cay. The light is 46 feet above the sea and may be seen 9 miles.

Directions.—Vessels bound to the ports on the north side of Cuba, eastward of Cardenas Bay, should approach them from the eastward. The Old Bahama Channel is seldom navigated from west to east, except by steamers and coasters.

Icacos Point is the northern extremity of the long and narrow peninsula which shelters Cardenas Bay to the northward. The point is low and has a few huts upon it. The shore to Maya Point is steep-to and may be approached within one mile, but is low, sandy, and covered with brushwood, the beaches being here and there interrupted by low bluffs. The bank of soundings extends only ½ mile off-shore.

Eight miles west of Icacos Point is a small cove called Varadero Bay. Four miles farther to the WSW. is the point and landing of Camacho, low and sandy. Five and one-half miles eastward of Maya Point is the mouth of the River Camaricoa, on the left bank of which is the town of the same name.

Port Matanzas.—The entrance to this port is open to the northward, and lies between Sabanilla and Maya points, bearing ENE. and WSW. from each other, distant 2 miles. It is about 4 miles in length, with deep water until nearly up to the shoals which shelter the anchorage. From Maya Point, which is low, with some huts on it, a rocky ledge extends about 1½ miles to the northward; and on a narrow bank of soundings, on the west side of the ledge, temporary anchorage will be found.

The western coast at the entrance is bordered by a reef, which extends off from 200 to 500 yards. Within the port there are the detached shoals, New, Stony, and another.

Matanzas, the second in point of commercial importance in the island of Cuba, is situated at the head of the bay. Population, 40,000. The town is triangular in shape, the apex being at the water front. The land rises from the water to quite high ground in the rear of the city.

On the summit of the ridge to the northward stands the church of Mont Serrat, overlooking the famous valley of the Yumuri. This, surrounded by trees and facing the harbor, forms a conspicuous landmark. There are several suburbs to the city proper. The only other prominent marks along the western shore of the bay are fort or castle Severino, barracks, and hospital. The bridges and warehouses mark the two rivers running through the town, San Juan being the one to the southward. The celebrated caves of Bellamar are under a low ridge, the highest point of which is Peñas Altas. The railroad connecting Matanzas and Havana runs along the above-mentioned ridge. The depot is in Pueblo Nuevo. It is built of red brick with French roof. It is just to the southward of the large sugar warehouse and coal yard known as "Almacenes de Torriente," situated on the southern bank of the San Juan River at its mouth.

Boats can either run into the San Juan River or alongside the dock, which runs to the northward from its mouth to the captain of the port's office. The market is ½ mile up the San Juan River, convenient to boat landings.

Salutes can be returned.

The United States is represented by a consul and vice-consul.

Supplies.—Water for ship's use can be obtained up the river. It is also brought off in a water boat at one cent per gallon. It is strongly impregnated with lime.

Coal may be procured in moderate quantities from $9 to $10 per ton.

Freight is towed off to vessels in lighters.

Port charges are about the same as Havana.

Hospitals.—The government hospital is the largest; it has an efficient staff; sick mariners are admitted at a stipulated price. The private hospital is supported by the best and wealthiest people in the city, and is for their own sick; patrons pay $5 per day. Sick mariners are charged $2 per day.

Steamers.—Ward's line of steamers from New York frequently stop here, also tramps for sugar cargoes.

There is telegraphic communication with Havana and two mails daily from Havana by railroad.

Pilotage.—Compulsory, 8 cents per ton in and out.

Anchorage.—The shoals are buoyed, but the buoys can not be depended upon. The shoals, however, as laid down on the chart can easily be avoided by a careful lookout and following the soundings as given on the charts. The bottom is stiff clay. But little difficulty will be experienced in picking out an anchorage, except in the sugar season, when the harbor may be more or less crowded; anchorage may be found in 10 fathoms outside of the reefs to the northward of Bajo Nuevo, the spot generally occupied by merchant steamers. It will be smoother, however, and more convenient to anchor inside Lajo Bank; and, as the latter is plainly visible at all times for its entire length, no trouble will be ex-

perienced in rounding either end, even if the buoys should be out of place.

Buoys.—Red conical buoys have been moored on the following shoals, which have been lately surveyed; on the reef north of Bajo Nuevo, north of Bajo La Laja, south of Bajo La Laja, on the Araña del Sur, and on the Araña del Norte.

Winds.—The sea breeze is regular, but it is sometimes interrupted for a day or two by a fresh southwesterly breeze that finally hauls to the NW. and dies away, to be followed by the regular sea breeze. As the bay is open to the ENE., a heavy swell sets in with fresh trade-winds. The Northers, which frequently blow from September to February, interrupt the land breezes, and the departure of a sailing vessel may be hindered on this account.

Tides.—It is high water, full and change, at Port Matanzas at about 8 a. m. and 5 p. m., and the rise 2½ feet. The stream runs in with the sea breeze and out with the land wind.

Directions.—When bound to Matanzas, the peak of Matanzas, which overlooks it from the west, is an excellent guide; and about 12 miles eastward of the port, and 6 miles inland, there is a small ridge of remarkably irregular hills, of considerable elevation, but not nearly so high as the peak, with three distinct summits, called the Camarioca Paps. From the paps the land westward is level and not very low, without any remarkable object as far as the port, where it begins to rise gently, and can be seen 24 miles, continuing uniform to the peak of Matanzas.

Coming from the eastward, give Maya Point a berth of 2 miles until the port is well open; then steer to the SW., hauling up gradually for about a mid-channel course, taking care to avoid the bank of sand and rock which borders the point at a distance of 1,200 yards. Approaching from the westward, give the westward shore a berth of about ½ mile. When San Severino Castle, a conspicuous object on the north shore of the port, bears S. 82° W. (S. 79° W. mag.), steer toward it until the fort of the Vigia, on the shore of the River San Juan, bears S. 54° W. (S. 51° W. mag.), then steer for it, passing northward of the buoy on the Stony Bank, and anchor in 5 or 6 fathoms water, mud, as the shipping will allow. As no reliance can be placed on the buoys, it may be advisable to take a pilot.

The River Canimar is in the SE. part of the bay. On the western point of its entrance is the battery of San Felipe. The river is navigable for 9 miles from its mouth, having a depth of from 6 to 15 feet. On the bar at the entrance there are only from 6 to 9 feet, and a heavy sea breaks there during Northers.

A number of small vessels load with fruit in this river for Havana and Matanzas.

The Rivers Yumuri and San Juan also empty into the bay, flowing through the city of Matanzas, and by the deposits of the sand and mud which their waters bring down form shoals and banks which narrow the limit and depth of the anchorage.

A shallow mud flat runs off in front of the city, preventing vessels from coming nearer to the wharf than ½ mile.

Coast.—From Sabanilla Point the low and sandy coast trends to the WNW. for 8 miles to Guanos Point, which is of little elevation. From Guanos Point as far westward as Havana, a distance of 36 miles, the coast is clear of danger, with the exception of the Jaruco Bank, and may be approached to a distance of 3 miles. It is steep-to, and the soundings decrease suddenly from 90 to 20 fathoms, sandy bottom. By attention to the lead there is no danger. The Jaruco Hills rise about midway, and with other objects serve to distinguish the coast. The current here may be about a mile an hour to the eastward.

The Pan de Matanzas can be seen from a distance of 36 to 40 miles. When seen from the NW. its summit forms three hummocks, the center one being much the highest, rising from behind a flat rocky ridge of land of moderate elevation. From the NE. it appears as a prominent rounded mountain, standing out by itself, and becomes a valuable point of departure. Should a vessel bound to Havana be found in a position thus far to windward or less, it will be better to stand in and run down within about 2 miles of the shore to avoid the current, taking care, however, to steer clear of the Jaruco Bank, on which there are only 11 feet of water and which lies about 1½ miles from the shore, midway between Havana and Guanos Point, off the Iron Hills. The discolored water on this bank, which is of some extent, may be seen from aloft in clear weather, and soundings appear to extend for a short distance all along the shore.

Several small streams empty into the sea between Havana and Guanos Point. Generally speaking, these rivers, excepting the Jaruco, can not be entered even by boats. The mouth of the Jaruco River is open to the north and only admits very small coasters.

The River Cojimar empties into the cove of the same name about 3 miles east of the Morro Castle. This cove is clear of danger and the shores are steep-to. The water, except very close in-shore, is too deep for vessels to anchor.

Telegraph Cable.—The end of one of the cables connecting Havana and Key West is landed here.

Light.—At the entrance of Port Santa Cruz a fixed light is shown, visible 9 miles.

Havana.—The entrance to the port of Havana may be easily recognized by the Morro Castle and lighthouse, with the extensive line of fortifications on the eastern side of the entrance. The land to the eastward of the city, until near the Jaruco or Iron Mountains, 18 miles distant, is about 200 feet high and the shore bold and steep-to.

Nine miles south of the Morro there is a remarkable isolated hill 732 feet high, with two round hummocks, called the Managua Paps. This hill is not only an excellent guide for Havana when coming from the northward, but useful also as a point of departure.

The channel for about ½ mile is not more than 200 yards wide; farther in it widens, opening into a basin of irregular shape, 2¼ miles long and from ½ to one mile wide.

Morro Point is steep-to and vessels of large draft may pass quite close to it. Soundings extend off from the point ½ mile. A shoal spot, with a depth over it of 26 1/10 feet, has been discovered between 120 and 150 yards from the shore line at Morro Point, the lighthouse bearing N. 20° E. (N. 17° E. mag.). The northern shore of the channel is bordered by the Cabrestante Bank, which, at the outer part, extends off more than 100 yards.

Both sides of the channel are marked by buoys, which are, however, frequently out of place. Men-of-war can generally, by applying to the captain of the port, obtain a mooring buoy to lie at.

Within the harbor the western shore is bold and vessels lie alongside the wharves. The arsenal is in the SW. angle of the harbor.

The population is about 250,000. The city is strongly fortified, there being several forts and castles. The streets are narrow and dirty, there being no sewerage. Yellow fever is endemic. The sickly season is from June to October. As there is little ebb and flow of the tide in the harbor, the water is filthy and foul-smelling. As a sanitary precaution, it is advisable to anchor as far from the southern light of the harbor as possible. The water should not be used for washing decks or clothing.

Hospitals are: Military, leprous, charity, and several private hospitals; also insane asylum.

Police are efficient and numerous.

Provisions of all kinds can be obtained in abundance. Water can be had from water boats which come alongside; it is good but hard, and is furnished to shipping at 75 cents per 100 gallons. An aqueduct supplies the city.

The usual supply of coal on hand is about 90,000 tons; cost, $8.50 to $10 per ton. Vessels can coal alongside the coal dock.

There is telegraphic communication with all parts of the world. There are many steamer lines to the United States and Europe.

A railroad runs to the principal places on the island.

The authorities are: captain-general, comandante de la marina, a vice-admiral, captain of the port (naval officer).

Salutes will be returned.

The United States is represented by a consul-general, a vice-consul-general, and a deputy consul-general.

Docks.—At the naval arsenal are ways capable of taking up vessels not over 500 tons.

There are several machine shops where steamers may repair.

Pilotage compulsory on all vessels except vessels of 50 tons and those engaged in the coasting trade. Night pilotage double day rates. For changing anchorage half pilotage is charged.

Rates.—Vessels of 50 tons, $5; 51 to 100 tons, $6; 101 to 150 tons, $7; 151 to 200 tons, $8; 201 to 250 tons, $9; 251 to 300 tons, $11; 300 to 350 tons, $13; 351 to 400 tons, $17, and $1 additional for every 100 tons additional up to 1,000 tons; 1,001 to 1,250 tons, $24; 1,251 to 1,500 tons, $25, and $1 additional for every 500 tons additional up to 5,000 tons; 5,000 tons and upwards, $32.

Anchorage Dues vary from $2 for vessels of from 51 to 75 tons to $8.50 for vessels of 5,000 tons and upwards.

There are no tonnage or light dues.

Tugboat Charges.—Vessels of 200 tons pay $17; of 700 tons, $60, from one mile outside the Morro to the anchorage.

Mooring Charges.—For from 151 to 200 tons, $2.75; for 300 tons, $3, and 50 cents additional for each 100 tons. For 5,000 tons and upwards, $8.50.

Tonnage Tax, 3 cents per ton.

Buoys and Beacons.—Three black buoys mark the northern entrance to Havana Harbor, and are named, respectively, Apostales (2) or outer buoy, Pescante (4) and Pastora. The southern side is marked by three red buoys called Punta (1) or outer buoy, San Telmo (3) and Pescadera (5).

When vessels are entering by night, a red light is placed on Apostales (2) buoy and a green light on San Telmo (3) buoy.

Feliciano Shoal, north side of the harbor, is marked at the south extreme by a triangular beacon, painted white.

Regla Shoal, opposite the harbor entrance, is marked on the eastern side by a triangular beacon, painted white; to the northwestward by a buoy; on the western side by a triangular beacon, painted white.

Cayo Cruz.—The bank NW. of this cay is marked by triangular beacons, painted white.

Warping Buoys are moored westward of Regla Shoal for vessels of war, and eastward of that bank for merchant vessels.

Time Signal.—A black ball is hoisted daily on the flag-staff of the office of the Naval Commandant at 10 minutes before noon. The ball is dropped at exactly mean noon for the meridian of said building, equivalent to 5h. 29m. 23.55s. Greenwich mean time.

If for any reason an error is made in dropping the ball, it will be indicated by hoisting a blue flag on the same flagstaff, and the ball will be run up again at 0h. 50m. p. m. and dropped exactly at 1h. p. m.

Semaphore.—A semaphore has been established on the highest part of Morro Castle. The semaphore is connected by telegraph with the interior of the island, and messages can be sent to or from vessels from or to places in the interior, at fixed charges.

Storm Signals.—During the hurricane season the following storm

signals will be displayed, successively, from the office of the captain of the port and repeated by semaphore from the Morro:

Day signals.	Night signals.	Indications.
A triangular red flag	A red light	Signs of bad weather.
A square flag with yellow and blue horizontal stripes.	A red light over a white light	Decided indications of bad weather.
A black ball	(No night signal)	The port is closed.
A black ball over a triangular red flag.	A white light over a red light	Indications of clearing weather.
A black ball over a square flag with yellow and blue horizontal stripes.	A white light	Clearing weather.

Vessels lying at the moles will send down light spars and strengthen their moorings as soon as the signal, "Signs of bad weather," is made.

Light.—A lighthouse, stone color, stands on the Morro Castle at the entrance of the harbor, and exhibits a white light, revolving every half minute at 144 feet above the sea, and should be visible 18 miles.

Tides.—It is high water, full and change, in Havana Harbor, at 8h. 14m., and the rise is about 3 feet. There is no regular flood and ebb, but with the land wind a slight stream usually runs out.

Directions by Night.—When about 2 miles NW. of the entrance a blue light should be burned, which will be similarly answered from the harbor office if the pilot is coming out. Should the signal remain unanswered, it should be repeated three times at intervals of 10 minutes. When no answer is made there is danger, or some obstacle to prevent entering by night.

Do not approach nearer than one mile until the pilot boards; a flashing light from his boat will indicate his approach.

When there is too much sea to permit the pilot to come out of port, he will be met in the channel. Steer in S. 50° E. (S. 53° E. mag.), with the green light on San Telmo Buoy just open south of the red light on Apostales Buoy. Between these buoys the pilot will either board or lead the way in.

General Directions.—Vessels bound to Havana from the westward, having rounded Cape San Antonio, with the usual trade wind at east, should not steer higher than north (N. 3° W. mag.) for 15 miles, when they may haul to the wind, and the chart must be their guide along the Colorados. Here, however, the current generally sets to the SW. on the edge of the bank. It will, therefore, be better to stand to the northward as far, at least, as the parallel of 24°, before tacking.

Vessels bound to Havana from the north and east will navigate either by way of the NW. Providence Channel, across or along the western edge of the Great Bahama Bank, round the Elbow of the Double-headed Shot Cays, and thence across toward Guanos Point in Cuba, out of the stream; or through the Old Bahama Channel.

Entering under sail, time will be saved by waiting until the sea breeze has set well in, which commences about 10 a. m. In the winter

months, from October to June, a vessel will generally fetch up to the anchorage; but in the summer, as the wind prevails to the southward of east, she may have to warp in. In the former case, if coming from the eastward, after passing the Jaruco tower and bank westward of it, run down about ½ mile or more off shore, and having brought the lighthouse to bear about S. 20° E. (S. 23° E. mag.) (not before, in order to avoid any sweep), haul up under all plain sail, so as to shoot as far in as possible, and with both anchors clear.

Having passed Morro Point at the distance of 150 yards, hug the northeastern shore as near as the wind in general allows, but in a vessel of heavy draft do not go inside the buoys on either side of the channel. The helm must be quickly and well attended, to take advantage of the strong gusts and flaws.

When off the east end of the heights the breeze will be more steady, and the sail may then be reduced to enable her to take up a convenient berth among the numerous shipping. Should it be necessary to anchor in the narrows, give a good scope of cable, and shorten sail quickly to avoid dragging, as the wind rushes off the shore with great violence.

If the sea breeze hangs to the southward of east the vessel will have to be warped in, and most probably to be kedged up the outer part of the channel. In this case, when coming from the eastward and having passed the Morro close aboard, stretch over to the Punta shore, and having tacked under it, shoot in as far as possible and anchor under the northern shore, waiting until the breeze slackens in the afternoon to warp up.

A good berth for a ship of war is in the NW. part of the harbor just past the floating dock; the water here is cleaner. Unless the shipping is crowded, there is no necessity to moor; anchors bury themselves in the mud.

There will be no difficulty whatever in quitting the harbor, as the regular land wind is seldom interrupted except by Northers, which sometimes throw a heavy swell into the harbor's mouth. The best time to enter is about midday, and for quitting it, daylight.

Currents.—Nothing is more uncertain than the point where the great Florida Stream is first met with. Sometimes it will be found 50 miles to the SW. of the Tortugas Islands. The vessel's position, by chronometer, should therefore be ascertained as frequently as possible. Under any circumstances, it will be better to avoid the Cuba shore until the vessel is well to to the eastward, when it may be necessary to sight the highlands in order to check the reckoning. In approaching the Cuba shore the easterly stream will seldom be met with until nearly on the meridian of Havana, or on the line between there and the Tortugas. It generally runs at the rate of from 2 to 3 knots close off the mouth of the harbor, and from thence in a NE. direction right across the Florida Strait.

It frequently happens that having arrived at a position south of the

Tortugas without feeling the influence of the stream, it is perhaps entered soon after the reckoning has been checked in the evening, and in making the land on the following morning the vessel will be found far to windward of the port. The features of the land to eastward, however, differ so considerably from those to the westward that there will be no difficulty in making out the position. The land eastward of the Morro is about 200 feet high and rather flat, but about 18 miles to windward it rises into a remarkable ridge of irregular hills of moderate height, about 3 miles in length east and west, and a short distance from the shore, called the Jaruco or Iron Hills, while 18 miles westward of the Morro is the Mariel Table-land, and farther on in the same direction the Cabañas Hill.

Cape San Antonio, the west end of Cuba, is low, covered with trees from 70 to 80 feet high, which are seen before the land, and often appear like vessels under sail; the shore is intersected alternately by soboruco cliffs and sandy beaches. The extreme end of the island bends round so gradually for about 4 miles that it is difficult to make out any projecting point, so that the cape can only be recognized by the lighthouse on the sandy beach. Near Perpetua Point a bank commences, which sweeps round the west end of the island about a mile off shore, and joins the Colorados Reef to the northward of the cape. On the edge of the bank there are from 18 to 23 fathoms water, rocky bottom.

Light.—The lighthouse on Cape San Antonio exhibits, 128 feet above the sea, a white light revolving every half minute which should be visible 17 miles. A boat can easily land under the lighthouse at a small breakwater extending from the sandy beach.

Temporary Anchorage will be found under the west end of Cuba, with the north extreme of the land bearing N. 23° E. (N. 19° E. mag.) and the south extreme bearing S. 45° E. (S. 49° E. mag.). This anchorage must be approached carefully, as it shoals quickly and the bottom is foul.

Lieut. Pillsbury, U. S. Navy, considers the following to be a better temporary anchorage, and reports: "I anchored in 10 or 11 fathoms, sandy bottom, and no coral heads, the light bearing N. 56° E. (N. 52° E. mag.). A coral reef extends about a mile off shore, its outer end bearing north (N. 4° W. mag.) from the anchorage, about ½ mile distant."

Antonio Knoll is a coral bank, about 2½ miles in length and 2 miles broad, with a general depth of 14 and 16 fathoms. One spot, on which only 10 fathoms were found, lies N. 24° W. (N. 28° W. mag.) about 10 miles from Cape San Antonio light and its center is 4 miles from the edge of the Colorados Bank; discolored water may be seen over it in clear weather. About 11 miles N. 15° W. (N. 19° W. mag.) of the light is another patch of 10 fathoms. In 1887 soundings of 3¾ to 7 fathoms were obtained on the knoll with the lighthouse bearing S. 18° E. (S. 22° E. mag.), distant from 11 to 12 miles.

Although several shoals have been reported in the vicinity, it is evident from the examinations made by the U. S. S. Tallapoosa in 1883 and the U. S. Fish Commission steamer Albatross in 1884 that there is no danger to navigation outside of the Colorados Reefs, the discolored water seen over the Antonio Knoll doubtless being the only ground for supposing that any shoal existed.

The Coast forming the headland of Cape San Antonio runs in a NNE. direction 4½ miles to Cajon Point, its north extreme. All this part is low with a sandy beach; in front of it the bottom is rock and sand, and a vessel if necessary may anchor for shelter, but as the bank is so narrow and shallow, especially southward of the lighthouse, caution will be necessary in choosing a berth. Vessels of more than 15 feet draft should not attempt to cross the reefs. Heavy squalls are sometimes experienced in this neighborhood. About a mile N. 6° W. (N. 10° W. mag.) of Cajon Point is a sandbank about ½ mile in extent, with rather less than one fathom water on it.

As the coast and cays inside the Colorados Reefs will be described, it will be sufficient now to say that the former trends from Cajon Point in a general ENE. direction for 35 miles to the entrance of Guadiana Bay, and from the north point of the bay NW. by N. 11 miles to Avalos Point, thus forming a deep bight; it then curves gradually round to the NE. for 85 miles to Bahia Honda. On about the meridian of 84° the land becomes lofty and forms a conspicuous mass of hills called the Cockscomb Mountains or Sierras de Acosta, in which there is a remarkable notch that may be used as a good point of departure. About 12 miles SW. of Bahia Honda is Saddle Hill, or Guajaibon Peak, 2,532 feet high, which may be readily recognized by the form of its summit, and is also a good guide when beating up.

Colorados Reefs.—This great extent of coast is skirted nearly the whole way by dangerous broken reefs, called the Colorados, leaving shallow water within, navigable between the cays and numerous heads of rocks for coasters drawing 10 or 11 feet water, which find an entrance near Cape San Antonio and through some intricate channels to the NE. The outer limits of these great barrier reefs are but imperfectly defined, and should therefore be approached with the utmost caution, for the lead will give scarcely any warning, and the sea on the shoals seldom breaks. The land at the SW. part of this shore is so low as to be out of sight from the edge of the reef, and the current in the immediate vicinity is strong and extremely variable.

The edge of the bank, which passes a mile westward of Cape San Antonio, runs about N. by E. for 7 miles, with from 4 to 2¾ fathoms water on it, sand and rock; then NE. by E. 3½ miles, where there is a detached 3-fathom patch, nearly a mile outside the edge of the reef, on which there is from 3 to 5 fathoms water; thence it trends more to the NE. and eastward, skirting about a mile off the reefs with 4 to 8 fathoms water on it as far as Bahia Honda.

Nearly 15 miles N. 32° E. (N. 28° E. mag.) of Cajon Point lies the SW. extreme of these extensive reefs; thence running NE. by N. for 24 miles to Buena Vista Pass. The reefs are here 3 miles in breadth in the middle part and 2 elsewhere.

The outer edge of the reef at Buena Vista Pass appears to be about 5 or 6 miles from the west end of the cay of the same name, the first islet met with coming from the SW., and which may be seen 12 miles. From this pass the line of reefs continue to the NE. for about 45 miles, and then trends more easterly until it almost joins the shore westward of Bahia Honda. These remarks are intended merely as a general description of the limits, and by no means to direct a vessel along the edge of these dangers.

The Leña or Mangles Cays, a group of four small islets, are low and covered with mangrove trees. They are separated from each other by narrow channels, shallow at the entrance but deep inside. The largest of these cays, called Punta de Afuera, is low and marshy. It is separated from the coast by a bay, nearly landlocked, being protected to the eastward by a salient point. This point forms, with the eastern end of Punta de Afuera Cay, the Barcos Channel, where vessels drawing not more than 15 feet may find sheltered anchorage.

Barcos Channel.—The points at the entrance lie east and west of each other, a small reef extending from each, so as to leave a clear channel 200 yards wide, with a depth of 2 fathoms, muddy bottom, at the entrance. Inside, the channel deepens to 4½ fathoms, widening at the same place to 500 yards, again narrowing and shoaling as a small submerged cay is approached.

This small cay forms a channel about 6 feet deep, by which small vessels may reach the bay above mentioned. To enter it a sailing vessel needs a fair wind, but the entrance has no danger, and inside a vessel may anchor as convenient, there being 5 fathoms of water close to the mangroves.

There are several small cays, having only boat channels between them, in the bay to which the Barcos Channel leads. The general depth is from 6 to 9 feet.

Rebellines Cays.—To the westward of Afuera Cay are three other small mangrove cays, the northern and smallest of which is called Leña Cay, the other the Rebellines. The latter, lying about ¼ mile off the coast, has a small reef running off the southern side.

Anchorage can be found to the southward of the Rebellines, sheltered from Northers, in about 2 to 2½ fathoms of water, muddy bottom.

Near the shore there are some rocky heads.

Caravela Chica and Grande Points.—From Caravela Chica Point the coast trends about NE. 3½ miles to Caravela Grande Point; thence forming several bays 6½ miles to the western extremity of Plumajes Point. Half a mile northward of Caravela Chica Point there are several

rocky heads, with 3 feet water on them; but thence as far as Plumajes Point there are no dangers and the bottom is mud.

Plumajes Point is a bluff. Although not high as compared with the land in its vicinity, it is easily distinguished. From the eastern end a reef extends ¾ mile to the N. 70° E. (N. 66° E. mag.), and rocky ground extends 2 miles farther in the same direction.

Tolete Point.—Six miles eastward of Plumajes Point is Tolete Point, and 4½ miles farther is Guadiana Point, the land between forming a bay a mile deep, with 2¼ fathoms water.

Guadiana Bay.—Three quarters of a mile northward of Guadiana Point is Algodonar Point, forming between them the entrance to Guadiana Bay. From these points the coast runs eastward on either side for ¾ mile, forming a channel ½ mile in breadth, which is narrowed by mud banks having about 1½ fathoms water on them, which extend off on either side for 200 to 400 yards.

The navigable channel varies from 200 to 400 yards in breadth, and carries about 3½ fathoms water, as far as the entrance to an inner bay, which runs to the NE. The outer bay is nearly circular and 4 miles in extent, and when in the fairway channel there are 2½ fathoms water. Being in the center of the bay and anchored in the middle of the passage, in 2½ fathoms, southward of a small beach, a vessel will be sheltered from all winds. On the beach there is a lagoon with fresh water.

The River Güanes or Guadiana empties into the NE. part near its mouth. On the northern shore is Geronimo Point, off which a reef extends ¼ mile to the SE. The river has a depth of about 7 feet, but is so narrow and crooked that boats only can navigate it. The towns of Guane and Paso Real export from here.

Colorada Point.—From Algodonar Point the coast forming a bay trends NW. by N., 3½ miles to Colorada Point, from which a sand bank extends ¾ mile westward. NW. 3½ miles from Colorada Point is Pinalillo Point, forming between the bay of Garanacha. In this space the coast is a little elevated and covered with pine trees.

Garanacha Bay, although exposed to westerly winds, affords good anchorage, gales of wind from that quarter rarely blowing. The holding ground is good, the bottom being muddy. In the center of the bay, 1½ miles offshore, there is a depth of 1½ fathoms at high water. There are only 6 feet of water at low tides 400 yards offshore, so that lighters can not reach the landing place at that time. On the shore is a small beach, with roads leading from it towards the towns of Mantua, Guane, and Pinar del Rio.

During the rainy season water may be had from a lagoon near the beach; in the dry season it is procured from the Santa Lucia River, which empties into the bay.

San Francisco.—Pinalillo Point is foul, and 4½ miles NW. of it is Avalos Point, which is a narrow tongue of land projecting seaward

more than a mile. There is anchorage under its lee sufficiently clear of danger during the season of northerly winds. Between the two points is a bay 2 miles deep, where there is an inlet, and within which is the loading place of San Francisco.

Buena Vista River.—From Avalos Point the coast, of little elevation, forming several small bays, trends about NNE. 11 miles to the mouth of the Buena Vista River.

Arroyos Anchorage.—Between the point of Buena Vista River, the cay of the same name and Ingleses Point on the south, is Arroyos Anchorage, sheltered from all winds from NW. round by north and east to SW. It is clear of danger, with a depth of 2¾ fathoms, which gradually diminishes to the shore. In the middle of the bay which forms the anchorage there is a wooden pier, by which coasting vessels load and unload.

This is the principal loading place of Mantua, 9 miles inland. To reach this anchorage from the northward, a vessel should enter Buena Vista Pass, and steer between the Colorados and the reef extending from Buena Vista Cay, the depths in the channel being from 2 to 3¾ fathoms. The channel between the reefs at the east end of the cay and Buena Vista Point on the mainland opposite carries about one fathom water, which is used by small steamers, and sailing vessels with a fair wind.

Buena Vista Cay, separated from the coast by a channel about a mile wide, is the largest of all those on this part of the coast. This cay is 5 miles in length east and west, and one mile in breadth; it is low and marshy, and divided in the middle by an inlet navigable by boats. From its NW. point a mud bank extends off 200 yards, and near the western point there are 6 feet water. A small cay lies off the former point with a passage between for boats and also another small cay, named Abra, off its north side.

One mile NW. of the cay is a bank about 7 miles in length NE. by N. and SW. by S. and one mile in breadth, with about 5 feet water on it; but there are passages between it and the reefs.

Buena Vista Pass has only 2 fathoms of water in some places, and is only 200 yards wide. From this pass to that of Roncadora the reef is not less than one mile wide.

Rapado Cay is three miles in length NE. by N. and SW. by S., and partly marshy, with mangroves. A reef extends about 600 yards from its northern part, with 1¼ fathoms water on it; and a similar reef projects 400 yards NW. from the western point. The distance from this cay to the coast is 3 miles, where the loading place named Canas is situated, and which is south of the cay. The passage between the cay and the coast is only navigable for small coasting vessels of about 4 feet draft.

Two miles westward of the west point of this cay lies a rocky bank with 5½ feet water on it, named Vinagera. To the SW. and near the cay are two small cays, named Toro and Vaca.

To the NE. by E. of Rapado Cay, over a space of 6 miles, lie four banks of sand and mud with scarcely a fathom water on them. There are passages between the extremities of the shoals and Rapado and Diego Cays, but small vessels only can pass between the banks. The passage between the banks and Rapado Cay is a mile wide and of moderate depth; that between the banks and Diego Cay is the same in breadth, and from 1¾ to 2¼ fathoms deep, mud bottom. These passages are useful in proceeding to the bay and loading place of Santa Rosa.

Rapado-Chico Cays.—Half a mile southward of Rapado Cay is the northern of the Rapado Chico, a group of four extending north and south 2 miles. The passage between the latter cays and Rapado is 1¼ to 1¾ fathoms deep, and leads to the loading places of Santa Isabel and Canas. The channel between the southern Rapado Chico and Buena Vista is 1¼ to 1¾ fathoms deep, clear of danger, and 2 miles in breadth.

Rapado Pass.—From Buena Vista Pass the reef trends NE. 10 miles to Rapado Pass. This channel lies NW. by W. 2¾ miles from the north end of Rapado Cay, and the least depth is 2¾ fathoms, rocky bottom.

Canas and Santa Isabel.—From the River Buena Vista the coast runs about NE. by N. 4 miles to the north point of the loading place of Santa Isabel, and thence with some sinuosities about N. by E. 3 miles to the point north of the loading place of Canas, when it trends to the eastward 2 miles to the head of Santa Rosa Bay.

Santa Rosa Bay and Diego Cay.—From the head of Santa Rosa Bay the coast runs about NNE. 6¼ miles to Tabaco Point. Three miles from Tabaco Point, and 1½ miles from the coast lies Diego Cay, which is 1½ miles in length east and west, and a mile in breadth. From its north end a reef extends ¾ mile to the NW. and then trends as far and round Tabaco Point to the western point of Baja Bay. This reef is of rock, and has less than one fathom water on it. To the ENE. of Diego and near the coast are two small marshy cays named Eslabones, and eastward of these two others at a distance of 600 or 800 yards, the larger of which forms Tabaco Point, and the smaller, at 200 yards ESE. of it is separated by a narrow channel.

Diego and Roncadora Passes.—From Rapado Pass the reef runs NE. by E. 3¼ miles to the first of the Diego Passes, and after forming the second 2 miles farther to windward, continues NE. 4 miles to Roncadora Pass. The two passes of Diego are 1¾ fathoms deep; the weather one lies 3 miles from Diego Cay, and the lee one 2½ miles. The Roncadora Pass is a mile in breadth and 2¾ fathoms deep. To enter it coast along the edge of the reef until the town of Baja, on rising ground 2 miles inland, is in sight, then bringing the tower of the church on with the little hill of Acostas; this mark will lead through mid channel with depths of from 16 to 26 feet after passing the reef.

Baja Bay is a secure anchorage, being only open to NW. winds. In this direction the reefs are at no great distance and prevent any heavy seas from rolling in. At the head of the bay there is a landing place,

serving as a port for the town of Baja about 3 miles inland. Vessels of light draft lie ½ mile off the landing in 8 feet of water.

Alonso Rojos Point.—At 2½ miles from the loading place of Baja is Alonso Rojos Point, which is formed by several small cays close to the shore; thence the coast, after forming a large bay, trends about NE., with various sinuosities as far as the point southward of Jutias Cay.

Jutias Cay is nearly 3 miles east and west, and 12 in circumference; the northern part of it is firm land, but the southern is marshy; at its western end there is a fisherman's hut. It is separated from the coast by a channel about 200 yards in breadth, navigable only with difficulty by boats and canoes.

Nombre de Dios Bay is between the western point of Jutias Cay and Jaguey Point. The entrances are nearly closed by an extensive mud bank. There are two channels of entrance to the bay, both marked out by beacons; one of these is within 200 yards of the shore of Jutias Cay and the other is 400 yards farther to the westward. Each of these channels is 100 yards wide and carries a depth of from 11 to 16 feet of water.

Galera and Jutias Passes.—From Roncadora Pass the reef runs about NE. 6 miles to Galera Pass; its breadth in places is 1⅓ miles, and its outer part is about 5 miles from the coast. Galera Pass is about 500 yards wide, and in its middle 2¾ fathoms deep; it lies 2 miles west of the NW. point of Jutias Cay. Jutias Pass is one fathom deep, and formed by a reef on the east, and a ridge of rocks almost awash extending from the NE. point of Jutias Cay; this pass is divided into two narrow channels by a bank with little water over it.

Reef between Jutias and Leviza Passes.—From Jutias Pass the reef runs about NE. 13 miles, and then trends nearly east 13 miles to Leviza Pass. Its greatest breadth is 1½ miles, and the outer line from 4 to 6 miles from the land.

Santa Lucia Point.—From the north point of Jutias Cay its shore and the main land run SE. 3 miles to the head of a shallow bay; thence it trends NE. ½ N. for 6 miles to Santa Lucia Point. Two miles farther on is the western point of Malas Aguas Bay.

Malas Aguas Bay is about 2 miles across at the entrance, and 1½ deep. From its eastern point the coast trends about E. by S. 2¼ miles to the mouth of the river Azúcar, where ½ mile up is good fresh water and the best found anywhere within the reefs.

About 1¾ miles NW. of the mouth of the river is the small Cay Boquerones, separated from the weather point of the bay by a channel 1¾ fathoms deep, but in navigating it a pilot is necessary, as the shore is bordered by reefs.

Inés de Soto Cay extends NE. and SW. 4½ miles; its northern part is firm land, but the southern is marshy. Seen from the northward the cay appears to be divided by a small channel, which is only an inlet 300 yards in extent; 400 yards off Gallegos, the NW. point, is a mud-

bank with about one fathom water on it, which extends 200 yards east and west, and 100 yards in breadth. Between this shoal and the outer reefs is the channel nearly a mile wide and 1¾ fathoms deep, and which is used by coasters.

San Cayetano Bay is formed on the west by Inés de Soto and Legua Cays, and on the east by Lavandera Point. On the shore there are several storehouses for copper ore, and a wooden pier. It is clear of danger, and the bottom mud. In proceeding for this bay it will, however, be necessary to guard against a reef which extends 800 yards SE. from the east point of Inés de Soto Cay. The best berth is in 2 fathoms water, with the east point of Inés de Soto Cay bearing N. 41° W. (N. 45° W. mag.) and Lavandera Point N. 26° E. (N. 22° E. mag).

Lavandera Point is 1½ miles east of the eastern point of Inés de Soto Cay, apparently on the main land, but really the northern point of a cay 3 miles long, separated from the Cuban shore by a narrow channel uniting San Cayetano and Berracos Bays. The northern part of this cay is of dry land, but all the rest, except a small beach on the western side, is swampy and covered with mangroves.

Berracos Bay.—About 1½ miles eastward of Lavandera Point is a group of three small cays, marshy and covered with mangroves, named Uvas; ¾ mile SE. of these cays is a point which, with the western of the Berracos Cays, about a mile to the NE. form the bay of this name, which is 1½ miles deep. Within the bay lies a small cay southward of the eastern of the Uvas.

The Berracos are two small, low cays, joined to the coast by a reef preventing the passage of boats and sheltering the anchorage of Berracos Bay. The channel leading to this anchorage has a depth of from 9 to 16 feet, gradually diminishing toward the shore.

Arenas Cay, north of the Berracos, is separated from the reefs outside by a channel 500 yards in width, navigable for boats only; its southern portion is swampy. There is a short reef extending from its SW. point.

Dios Cays are two small swampy islets lying east ¼ mile from Point Purgatorio and very near the coast.

Purgatorio Point.—About 2½ miles eastward of the Berracos is the mouth of the River Medio; thence the coast trends NE. by E. 4 miles to Purgatorio Point, forming between two small bays.

Leviza Cay.—A mile northward of Dios Cays is the middle of Leviza Cay, and in this space, reduced by a reef which extends 400 yards from the south side of the latter, the channel carries 1¼ to 2 fathoms water over mud. Leviza Cay extends 2 miles east and west, and is divided into two, by a narrow channel, fit for boats; its north part is firm land, but its southern marshy.

Nearly 2½ miles SE. of Leviza Cays is the entrance to the River Puercos, but the water is not good.

Alacranes Point and Cays.—At 2¾ miles N. 83° E. (N. 79° E. mag.) of Leviza Cay is Alacranes Point, with several cays near it, named Casigua and Alacranes, which are separated from each other by small channels used by canoes. Alacranes Cay lies a little eastward of the pass of the same name, and separated from the reefs by a channel a mile in breadth and 6 or 7 feet deep, named the Reduan Pass. The north part of this cay is firm land, and the southern covered with mangroves. It is separated from the coast by a channel ½ mile in breadth and about 2 feet deep.

Leviza Pass.—The outer edge of the reef passes 1½ miles northward of Leviza Cay, and after forming on the west the pass of that name, which has but little water, trends about NE. by E. 4 miles to Alacranes Pass; thence, leaving a space of about a mile between it and Alacranes and Casigua Cays, NE. by E. 3 miles, and then E. ½ N. 4 miles farther to Blanco Cay Pass.

Alacranes Pass carries only about 6 feet water, and lies with the eastern part of Leviza Cay bearing about S. 26° W. (S. 22° W.). Vessels of 6½ feet draft enter and quit this pass regularly, and sail between the reef and coast as far as Jutias Cay. Four miles N. 83° E. (N. 79° E. mag.) of Alacranes Point is the small Cay Ratones, and 2 miles N. 71° E. (N. 67° E. mag.) from the latter is Blanco Cay, also very small, and only seen from the reef.

Mulata Bay.—About a mile SW. from Blanco Cay is the point and River of Medio, and a mile farther to the southward the bay and loading place of Mulata.

Gobernadora Point.—From abreast Blanco Cay the coast trends NE. ¾ E. 7½ miles to the mouth of the River Manimani; thence with little elevation E. ½ N. 3 miles to Governadora Point.

Blanco and Manimar Passes.—The Blanco Pass is 1¾ fathoms deep and runs in about a SE. by S. direction. From this pass the reef trends about NE. by E. 5 miles to Manimar Pass, where small vessels of 5½ feet draft can enter; thence the reef runs a little more northerly, about 1½ miles from the coast, to Gobernadora Point, from which it extends off about a mile, and then trending nearer the coast, terminates in the reef off Pescadores Point, at the west side of entrance to Bahia Honda.

Directions.—Vessels of 7 feet draft can navigate within the reefs, but with any sea the Alacranes Pass is somewhat dangerous; it will therefore be better to take Galera Pass. In passing near Diego and Rapado Cays, care should be taken to avoid the banks in their vicinity. A vessel may pass east or west of the bank lying NW. of Buena Vista Cay. Near the reef the bottom is rocky, and many isolated heads are met with, but near the coast it is sand and mud. There are several detached patches of 3 fathoms in the large opening between the Colorados and Cajon Point, and nearly in mid-channel lies a bank 5 miles in length, with only 2 fathoms water on its shoalest part. These can generally be avoided by the eye, the chart giving their positions.

Albatross Bank, reported in 1844 as approximately in latitude 22° 49′ N. and longitude 84° 17½′ W., has 9 fathoms water over it, with hard bottom. H. M. S. Royalist, in 1866, found no bottom at 120 fathoms close to its supposed position. The U. S. S. Albatross, in 1884, sounded in the position assigned to this bank, and found bottom in 950 fathoms, coral and sand.

Bahia Honda is a small well-sheltered harbor, with a depth of from 3 to 6 fathoms. Its entrance, however, is so narrow and intricate that a pilot is necessary in the absence of good local knowledge. The shore on either side of it is low and sandy. On the east side of the entrance is the small hill of Morrillo. The channel is about 2 miles in length north and south, and opens out into a land-locked basin, about a mile in diameter, but the interior is only fit for small vessels. From the base of the Morrillo a coral ledge runs off ¾ mile to the NW.; and from Pescadores Point, on the opposite side, a similar ledge runs off 600 yards to the NE., and the navigable channel here between the banks is not more than 300 yards wide.

From the Morrillo the shore treads SW. about ½ mile to Real Point, and the distance across to Caiman Point on the western shore is about 600 yards. The former point may be approached to about 150 yards, and the latter to 100 yards. From Real Point the eastern shore trends south nearly ¾ mile to Carenero Point, and ⅛ mile to the southward of this is a low mangrove cay called Largo, the west end of which, Difuntos Point, is seen from the entrance. This point is foul to the NW. for 400 yards, and the channel is here again narrowed to about 400 yards by this and the sand bank ¼ mile off the western shore. Within this is the basin.

The town is 6 miles from the bay, and contains about 1,000 inhabitants, and is now a closed port, no foreign trade being permitted. It has a fort, which is a good mark for entering. The health of the place is good except in the sickly season, which commences in April and lasts through the summer.

Directions.—To enter the harbor, bring the entrance to bear south (S. 4° E. mag.) and steer for it. When within the distance of one mile Difuntos Point will be seen between the sandy points on either side of the entrance, and beyond it a remarkable hill, with a square top, back of a sugar estate. By keeping the eastern end of this hill on with Difuntos Point a depth of 16 to 5 fathoms will be carried in. The eastern side of the entrance should be kept close aboard, and when abreast of Carenero Point a vessel may anchor in 6 fathoms of water, or, if it is desired to proceed farther in, she may stand on the SW. and anchor just within Difuntos and Mangles Points. Placer Point should be given a good berth, as a sand shoal just awash lies ¼ mile off it. Sailing vessels must wait for the sea breeze to enter, and for the land breeze to leave Bahia Honda. Although several streams enter into the harbor, good water can not be obtained in great quantity.

From Bahia Honda to Cabañas the shore should not be approached nearer than 2 miles.

Reef.—The American schooner Hattie Weston struck on a reef in latitude 23° 06′ N., longitude 83° 04′ W., at an estimated distance of 5 to 7 miles off shore. This shoal had been searched for without success, but as the Hattie Weston had to discharge cargo in order to get off, there can be no doubt of the existence of a shoal in this vicinity, though the position given may be wrong.

Cabañas is a good and well-sheltered anchorage and vessels of large draft may safely enter it. South of the port, 5 miles inland, there is a range of mountains 1,400 feet high at the western part, sloping gradually toward the eastward to a large plain extending as far as the table land of Mariel. At the eastern end of the heights there is a remarkable peak bearing S. 45° E. (S. 49° E. mag.) from the entrance to the harbor, and about the middle of the range there is a remarkable gap.

On the eastern side of the entrance there are two small hills, on the western part of which are the buildings of a sugar estate. The entrance is 1¼ miles wide, and when it bears south (S. 4° E. mag.) a guardhouse or tower with several adjacent buildings will be seen 2 miles inside. This tower is on the extreme of an islet called Don Juan Tomas Cay, which divides the harbor into two large arms.

A coral ledge extends off upwards of ¾ mile from the weather shore and 400 yards from the lee side, leaving a channel about 600 yards wide.

Direction.—When steering for port Cabañas, having opened out the tower, bring it to bear about S. 8° E. (S. 12° E. mag.), when it will be in one with a remarkable gap on the heights above. This mark will lead to the entrance of the channel in from 16 to 9 fathoms water, over sand. When the first point on the western coast, called Arbolitos, bears N. 86° W. (west mag.) the depth will decrease to 7 fathoms; then alter course to S. 13° E. (S. 17° E. mag.) carrying 6 to 4 fathoms in mid-channel, and the water will deepen to 13 fathoms on nearing Pescadores Point. With the gap open a little to the eastward of the tower a vessel will carry in 22 feet water; and with it open to the westward, double the breadth of the tower, she will have 20 feet.

Having passed Pescadores Point, haul up and anchor close under the weather shore in 7 to 9 fathoms, mud, near the entrance of the SE. arm; or keep away and come to in the SW. arm, in about 9 fathoms water, under the lee of the tower. In doing this, however, be careful to avoid a patch of rocks and sand, about 250 yards in extent, and on which there are 2¼ fathoms water; it lies nearly ½ mile N. 1° W. (N. 5° W. mag.) of the tower, and may be seen from aloft.

Caution.—In leaving the harbor it will be desirable for a sailing vessel to weigh with the early land wind, to insure its carrying the vessel well out before it fails, as there is generally a very heavy swell in the offing, and frequently a strong SW. eddy, which might set her on the reef skirting the shore.

The Town contains about 700 inhabitants and is closed to foreign commerce. There is telegraphic and postal communication with Havana by land. There are several streams of fresh water, but not very good. Salutes can be returned by the fort. The authorities to visit are the commandant of the fort and the alcalde.

The district is rich and fertile and occupied principally by sugar estates.

Between Cabañas and Mariel, 12 miles to the eastward, the coast is, in places, bordered by a reef ½ mile off shore. The edge of the reef is steep-to, and, as there is frequently a strong eddy to the SW., vessels must take care not to get becalmed in this vicinity.

Port Mariel.—The shore in its vicinity becomes a little more elevated, and a short distance inland, to the eastward of the port, there is a remarkable long flat ridge of table land of moderate height, with a notch or step at its east end, called the Table of Mariel, which can not be mistaken, and a little westward of it will be seen a remarkable cliff, facing westward in the harbor. The entrance lies NW. from the west end of the table, and on its eastern side there is a martello tower and some huts, and when the tower bears S. 6° E. (S. 10° E. mag.) a church and several buildings will open out in the interior.

The port is well sheltered, but its entrance is only 50 yards wide. The least depth is 4 fathoms. The eye will be the best guide in entering, and when within the narrowest part keep the weather shore aboard until abreast of Gorda Point, on the west shore, on which there is a small fort, when the vessel may anchor in 5 or 6 fathoms in safety.

The port is closed to foreign commerce. Cattle can be obtained at the sugar estates, but no provisions. Water can be obtained from the fresh-water streams. It is generally healthy, the sickly season being from April to September. The battery at the fort can return salutes. There is telegraphic communication, also a railroad, to Havana. There is a small police force. Pilots are not necessary.

Buoys and Beacons.—On the weather or eastern side of the entrance are two buoys, one on Los Cabazos abreast of Point Barlovento, the other farther in on the most projecting point of the shoal water; on the western side of entrance there is a beacon on Cayuelo, 14¾ feet high, surmounted by a ball, next a buoy on the edge of the shoal, which, with the buoy opposite, marks the narrowest part of the channel; there is also a buoy on the NE. extremity of the reef off Regla Point.

Coast.—The shore eastward of the Table of Mariel, which is steep-to, becomes rather low and flat until within a mile or two of Havana, when it rises into a few small fortified hills.

The shore is composed of dark-colored bluffs, clear of danger, and steep-to. Between Mariel and Havana are the mouths of the small Rivers Mosquito, Guajaibon, Banes, Baracoa, and Banta.

Reef.—Abreast the mouth of the River Jaimanita, 9 miles westward of Havana, a reef extends one mile off Mangles Point.

The Harbor of Chorrera is 4 miles westward of the entrance to Havana, at the mouth of the Almendaraz River. It is quite open to the northward, and has no bar or other obstruction at its entrance. The anchorage in 3 to 5 fathoms would scarely accommodate half a dozen vessels, and the holding ground is only coral sand.

Telegraph Cable.—At this place the end of one of the telegraph cables between Cuba and Key West is landed.

The rather low coast in the vicinity of the entrance to Chorrera is very ragged, the blackened coral rock being honeycombed by the sea.

CHAPTER VII.

CUBA, SOUTH COAST.

Cape Maysi. See page 107.

The Coast south of Cape Maysi is exposed to the eastward, the sea breaks upon it, and it should not be approached. At ½ mile south of the cape is Pintado Point, southward of which the shore is called the Coast of Pintado. At 1¾ miles from Pintado is Quemado Point, a little salient. Nearly a mile from the latter is Bufeo Point, and about 5 miles farther on is Negra Point, 300 yards north of which there is a spring of fresh water.

Pintado Bank is between points Pintado and Quemado. Near the shore there are from 4 to 8 fathoms of water, bottom of fine white sand. The edge of the bank is steep-to, there being from 18 to 28 fathoms 200 yards from the edge, and ¼ mile farther off no bottom at 90 fathoms.

Negra Point is a dark, barren, steep, projecting point, and easily distinguished; 1,200 yards off it there are 28 fathoms water, and at the distance of a mile the depth is more than 90 fathoms. From Negra Point the coast of soboruco, covered more or less with trees, forming a curve outwards, trends to the south and westward for 7 miles to Caleta Point; it is backed by the high land, which is close to it. About 60 yards SW. of Negra Point there is a little bay and a cave, formed by vertical cliffs, where the sea breaks heavily, and is called the Cliff of Point Negra. About 2½ miles SW. of Negra Point is Guanos Point, known by a wood of palm trees on it. Between the two points there are 28 fathoms water, rock and gravel, 1,000 to 1,200 yards from the shore; and between the latter and Caleta Point there are 18 fathoms, over gravel and rock, at 600 to 1,200 yards. Between Negra and Caleta Points the depth exceeds 90 fathoms 1¼ miles from the land.

Caleta Point. From Caleta Point the soboruco cliffs extend nearly a mile to the beach, called the Playa de Caleta, about 90 yards wide. A river flowing through a cut in the highland empties about the middle of the beach. Its mouth is generally choked up, except during the rainy season, and the water near the beach is salt. A little higher up, however, it will be found to be fresh and good.

From this beach the soboruco cliffs continue ½ mile to a white sandy beach called Playa Blanca. In the middle of this beach is a rocky point, just eastward of which and near the shore is a spring of excellent water.

Jauco River is ½ mile from the Playa Blanca, emptying over a sandy beach, and navigable for boats during the rainy season. Near the mouth of the river is a rocky point, having a cavern in it called the Cueva de Jauco.

All along this part of the coast the mountain range is close to the shore. The three cuts or ravines of Caleta, Caletilla, and Jauco are very conspicuous. The land is thickly wooded, especially near the River Jauco.

A rocky ledge commences near Caleta Beach and skirts the shore at an average distance of 300 yards as far west as Muertos Beach. A little outside of it, or about 400 yards from the shore, the depths are 9 or 10 fathoms; but off the point and cave of Jauco this depth is found at ½ mile off.

Anchorage. The anchorage of Caleta is on a bank of fine white sand, with a few spots of rock and gravel in the indentation between Caleta Point and the western extremity of the Playa Blanca. It is sheltered by high land from ESE. round by north to west. Although heavy squalls sometimes cause ships to drag here, this anchorage is very useful, as it is the only one in the vicinity.

In approaching this anchorage a vessel should steer in for the beach till within ¼ of a mile of the shore, and let go the anchor in 10 fathoms of water.

This locality may be known by two small hills on the slope of the high mountain toward Caleta Point. With the wind from south or SE. a vessel should not anchor here. A rocky head with less than 3 fathoms on it and 5 fathoms around it lies on the line between the beach and the point of Caleta at a distance of nearly 400 yards from the former.

Water can be obtained at low tide from a spring at Playa Blanca. Wood also can be obtained.

Seco River is only open during the rainy season, and during the remainder of the year is closed by two bars, one of stone, and the other, farther in, of sand. The water is hardly fit to drink, and is difficult to obtain by boats on account of the bars. In case of necessity the best place to water will be to the leeward of the mouth.

Llana Point.—The beach of Llana extends over a space of 2⅓ miles. In the middle of this shore there is a bed of a river called Cana, which is generally dry except in the rainy season; and 600 yards from the west extreme of the beach there is another glen, named Llana, which is also generally dry. Llana Point, composed of soboruco, projects a little at the western termination of the beach. The coast for 1¾ miles westward of the point is of cliffs, with one or two bays. In the first third of this space is the Leap of Jojo Point, which is high, salient, white, and seen at a great distance; the other two-thirds is high and steep. Jojo Point, 2¼ miles from Llana Point, is of black rugged rock, of moderate height, and at its inner part is an isolated elevation like a sugar loaf.

Jojo Bay lies between Jojo Point on the east and Tintorero Point

on the west. These two points are ⅜ mile apart, and between them is an anchorage for small vessels.

Jojo River empties into this bay, and from it and the ponds near its mouth good water may be procured.

Tintorero Point is low and sandy; a mile to the westward of it is the mouth of the river Tacre, and ½ mile farther on is Puerta Point, flat and sandy.

All along this part of the coast the high land rises abruptly from the shore, with breaks or ravines abreast of the Rio Seco, Rio Tacre, and Puerta Point. The mountains are covered with trees, with the exception of the Leap of Jojo, which is arid and barren.

The coast is bordered by a reef, broken in places, at an average distance of 200 yards from the shore. Everywhere along this part of the coast at ¾ mile from the land there are more than 90 fathoms of water.

Small vessels may anchor on the bank in Jojo Bay, sheltered from E. by N., round by north to W. by S., but it is not a place to be recommended, as the sea rolls in heavily. In standing in for it keep closer to Jojo Point than to the other side, to avoid a sunken rock, and anchor just inside of the line joining the two points in 9 or 10 fathoms of water, sandy bottom, about 300 yards off shore. Vessels anchoring farther out, in 13 or 14 fathoms, will be much more exposed to wind and sea.

Sombrero Rock, above water, lies about 60 yards off the eastern side of the beach.

There are a few small houses and some cultivated ground in the neighborhood, and a small amount of fresh provisions and water may be obtained.

Caution.—This anchorage should not be approached with southerly or SE. winds.

The Coast for 200 yards westward of Puerta Point is of soboruco; thence it curves somewhat outwards for a distance of 3⅓ miles. The shore for about ¾ mile west of the point is called Guayacanes, and near its west end and a little inland is the valley of the same name, with a break in the mountain. At the distance of a mile farther on is Guayacanes Point, which is dark, of moderate height, and projects, with two small bays between. To the westward of the point is a beach named Managuaco, about 1¼ miles in extent, with some scattered rocks near its western extremity; then follow some cliffs of soboruco, and the small bay of Caoba, which is of sand and scattered rocks, and lastly for about ⅓ mile a rocky shore, when commences the beach of Imia.

The Beach of Imia is about ⅜ mile long, and near its eastern end is the mouth of the river of the same name. To obtain water from the Imia River, the shore will be approached most easily WNW. of the small bay of Caoba, where it is clear of reefs. The mountains rise abruptly from the shore and are covered with trees. A broken reef skirts the shore at the distance of 70 yards.

Anchorage off Imia Beach is only available with northerly winds.

The only good position is about 400 yards off the eastern part of the beach, in 9 or 10 fathoms of water, with a bottom of sand and weeds. Wood, water, and fresh provisions may be obtained here.

Coast.—From Imia Beach the rocky coast of moderate height continues westward with an outward curve for 4 miles to Yacabo Point. In the middle of it is Imia Point, steep and of moderate elevation. Yacabo Point is a little salient, and from it the coast runs almost in a straight line to Piedras Gordas Point.

Piedras Gordas Point is so called on account of the large bowlders upon it. To the westward of this point the shore forms a bay, at the head of which is a beach 600 yards long. The shore is clear, except a rock near the eastern end of the beach, near which is a spring of fresh water, easier of access and more sheltered than the stream farther to the westward.

Guarda-raya Point is the western limit of this bay, and the next indentation in the coast to the westward is a small cove called the Guarda-raya de Yacabo, which is skirted by a flat reef and is almost unapproachable. The high land is here also very near the coast, with a break, through which runs the Yacabo River, emptying into the bay of the same name.

In this bay there is an anchorage entirely open to the southward. Vessels anchoring here should do so at the eastern edge of the beach to avoid the rocky heads off the western end.

Fresh provisions may be obtained from the neighboring houses.

To the westward of the Guarda-raya de Yacabo the coast is rocky for about ½ mile, followed by a beach ¼ mile long, with the mouth of the River Ocampo at its western end.

Sabana-la-mar Point is about 4 miles farther to the westward. It is a remarkable projection, steep and moderately high, with a rock on its summit, and is about 27 miles west of Caleta Point.

The Beach of Sabana is ⅓ mile in length; at its east end is a lake and at its west end a river of good water runs into the sea, with its mouth free of obstructions, where water can be had without difficulty. The beach of Ciguatos, ⅓ mile in extent, follows that of Sabana, and is separated from it by a small rocky cliff of about 120 yards in length. At the west end of Ciguatos Beach the river of the same name empties in the rainy season, and in order to approach it is necessary to close the middle of the beach and pass within the rocky heads until arriving at its mouth. Thence a rocky coast runs westward for 800 yards to a point somewhat salient, called Jaba, then for more than 1½ miles farther the coast is high and steep, and 800 yards from its west end is the bay of Jaba, the entrance of which is not more than 110 yards wide, with a shelly, rocky beach fronting it. At the back, on the hill, about 110 yards from the sea, there is a spring of good water.

From Jaba Bay the rocky coast runs a mile farther to the entrance of Port Baitiqueri, and ⅓ mile to the SW. of it is the point of the same

name. This part of the shore is called the coast of the Boqueron, from a break in the mountain, by which Santiago de Cuba may be known. The high mountains range all along to very near the coast, forming several breaks or openings.

Anchorage.—A vessel will find anchorage at about ¼ mile off the eastern part of the former beach in 8 or 9 fathoms water, sand, 400 yards from a rocky point which projects from the eastern end of the beach, and opposite a cave where the sea breaks; but it should not be used with south or SE. winds. This is the best place for casting, and farther westward the bottom is gravel and rock.

This locality may be easily known from a distance by the Pan de Azucar, visible 30 miles. It lies about ¾ mile N. 22° E. (N. 20° E. mag.) of the eastern end of Sabana-la-mar Beach, and, seen from the westward, has the appearance of a sugar loaf, but from the eastward looks like the roof of a house.

The edge of soundings here is steep-to and close to the shore, there being generally no bottom at 90 fathoms ½ mile off the land.

The coast is skirted here and there with reefs at from 50 to 100 yards from the shore.

Water is abundant, and fresh provisions are easily obtained from the neighboring houses.

Port Baitiqueri.—The entrance between the outer points is nearly 400 yards in breadth, but it narrows to about 90 yards at the inner point, when the harbor opens out to between 400 and 600 yards in breadth and about 1,200 in length. It is sheltered by the mountains which surround it.

The port can be readily recognized by the Pan de Azucar, which is about 5 miles from the entrance. Vessels bound to Baitiqueri from the southward or from well offshore, should steer in with the Pan de Azucar on a north (N. 2° W. mag.) bearing. When within a mile of the shore the mouth of the harbor will be plainly seen bearing west (S. 88° W. mag.) opening between the high hills or coast mountains, sloping down to rocky points on both the east and west sides, with an inner point of green trees and bushes on the west side. The reefs on both sides of the channel can be seen when close in to the land or when 400 yards offshore.

Between the outer entrance points the channel is 100 feet wide, but in the narrowest part it is only 50 feet in breadth, with a depth of 2 fathoms, increasing to 3½ fathoms; the reefs on both sides of the channel are seen when ¼ mile from the entrance.

There is a depth of from 9 to 15 feet water within the entrance, over muddy bottom of a slate color.

Supplies.—The only supplies to be obtained at Port Baitiqueri are wood and fresh water.

Winds.—Between Pintado Point and Baitiqueri the coast is sufficiently protected from north and NE. winds, which prevail during the winter

months, except between Pintado and Caleta Points, where the NE. winds, which blow hard, cause much sea. The land winds prevail all the year round at night, and blow fresh during the north and NE. winds, which much facilitates a vessel making easting, if the coast be kept close aboard so as to take advantage of them, as they do not reach far to seaward. From Baitiqueri to Guanos Point the coast can be approached to the distance of a mile, but from the latter point round Cape Maysi the coast should not be approached at night within 6 miles.

Current.—At a short distance from the coast the stream of the flood sets to the westward and that of the ebb to the eastward. The general current runs constantly to the westward during the months of July, August, and September, and its rate varies with the force of the wind.

Mal Año Point.—From Baitiqueri the rocky coast runs SSW. for 3 miles to Tortuguilla Point; thence nearly west for 2 miles to the River Yatera, which empties itself into a sandy bay; from here it again trends SW. for 3 miles to Mal Año Point, which is easily recognized from the east or west. About 4 miles westward of the point is Port Escondido, to the eastward of which and near the entrance are two isolated hills. All this part of the coast is free from danger and can be approached to a mile.

Port Escondido, or Hidden Harbor, as its name implies, is very difficult to discover until close to it; but the two small hummocks a little eastward of the entrance are a good guide from the southward. The entrance lies between two rocky points, about 200 yards apart, and is 300 yards in a NW. and SE. direction; but both sides are fringed with a coral ledge; that on the windward side extends off about 70 yards, leaving a narrow channel about 80 yards in breadth in the center, in which there are from 4 to 6 fathoms water. The interior opens out into an irregular form, the projecting mangrove points forming inlets of deep water close home to the swampy shores. Many small shoals lie in the way, but they are easily seen.

The port is sheltered from all winds, and fit for large vessels, but no directions can be given. The safest way will be to place a boat on the edge of the weather reef, and the eye, with the assistance of the plan, will guide in without much difficulty or risk, even with the wind as far north as NE. There is no fresh water to be found, nor is there any settlement near the shore, and consequently no pilots.

Port Guantánamo, or Cumberland Harbor, 12½ miles westward of Escondido, is capable of admitting vessels of large draft without difficulty, and in safety. The shore between it and Escondido forms small sandy coves, steep to. This port, which is altogether about 11 miles in length, north and south, may be said to form two harbors; the inner, called the bay of Joa, has, however, a depth of only from 12 to 15 feet, and the channel leading into it, although deep, is extremely narrow. In the center of the port the shores are deeply indented, forming small secure creeks, very convenient for vessels of light draft.

The entrance is nearly 1½ miles wide, and may be readily made out, and its eastern side is a straight rocky shore 1½ miles in length north and south. Just within the north end there is a low spit of dry sand called Fisherman Point, on which there are palm trees and generally one or two huts. The only danger on this side is a rocky ledge 600 yards in length, running off to the westward from Fisherman Point; on the outer part there is 15 feet. About ½ mile within the outer point is the beginning of a bank, which carries 3½ to 4 fathoms over it; this bank extends westward more than ½ mile, and the most projecting part of it lies with the mouth of the River Guantánamo, bearing about S. 80° W. (S. 78° W. mag.).

On the west side of the entrance to this part there is a lookout house erected on piles.

About ½ mile to the northward of the leeward point of entrance is the mouth of the Guantánamo or Augusta River, in which the depths are from 9 to 15 feet for a considerable distance within. Thence a low sandy shore bends round to the NW. and then NE., forming the north side of the outer port, and near the center of it there is a remarkable whitish brown cliff. A shallow bank or reef borders all this western and northern shore for about 400 yards.

There is a narrow rocky ledge with 18 feet of water on it about ½ mile within the outer points of the entrance. The various accounts of its location do not agree, but its most projecting point is believed to be ½ mile from the western shore and east of the mouth of the River Guantánamo.

Water may be obtained from the Guantánamo River, but the boats will have to proceed up as high as the Barcadero, about 11 or 12 miles from the mouth. It is also to be had from a small stream on the NW. shore of the inner harbor, the mouth of which is 300 or 400 yards eastward of a remarkable red and white cliff. Near it are some stakes, and over it a remarkable lofty tree. The stream, although not more than 16 or 18 feet wide, is deep enough for launches; but be careful to get out before low water, as then there are only 2 feet on the bar. A place for watering will be found a little way upon the starboard hand, where there is a cleared space on the shore, or on the port hand where there is a fall.

Pilots will go out to vessels advancing to the line between the point to windward of the harbor and San Nicolas Point. The pilot boats are painted white with a black "P" on bows, and they fly a white flag with blue "P" in center. Rates same as Santiago de Cuba, except at night one-half the regular rate in addition is charged, and for movement in harbor one-third of regular rates. Pilotage is compulsory except for men-of-war.

Dues.—No tonnage or light dues.

Cable.—The line of cable is indicated by three posts on Cayo Toro and one on Cayo Caoba.

Directions.—In approaching Guantánamo from the southward, on about the meridian of 75° 10′ W., a remarkable conical mountain will be seen to the NNW., about 15 miles westward of the harbor. As the land is approached this mountain will assume a saddle shape, and a small isolated hill, with two small paps or hummocks near it, will be seen to the westward. The east side of the entrance is a round hilly bluff, barren but of green color; the western point is low and woody. The coast is bold and steep to, and no soundings will be obtained until within the points. The eastern point can be rounded at 400 yards distance, and when abreast of it steer N. 19° W. (N. 21° W. mag.) for the brown bluff above mentioned on the northern shore. When Fisherman Point is well open haul up N. 24 °E. (N. 22° E. mag.), and when it bears S. 77° E. (S. 79° E. mag.) haul up N. 45° E. (N. 43° E. mag.) or N. 56° E. (N. 54° E. mag.) and anchor as convenient, with Fisherman Point bearing from S. 10° E. (S. 12° E. mag.) to S. 20° E. (S. 22° E. mag.).

The eastern shore is quite clear and a vessel may stand farther in if desired. It will be well for a sailing vessel to wait for the sea breeze to enter and for the land breeze to go out. Should it be necessary to beat in or out, do not stand inside the depth of 6 fathoms, and in standing to the eastward do not bring the brown cliff to the westward of N. 30° W. (N. 32° W. mag.) to avoid the Fisherman Ledge.

If proceeding into the Caimanera, or inner harbor, pass between Hicacal Point and Hospital Cay; when abreast the north end of the latter, steer for the narrow channel between Toro and Caoba Cays, passing about 200 yards westward of Largo Cay; when well through this channel, with Media Cay bearing S. 65° E. (S. 67° E. mag.), alter course for Point Salinas, and anchor off the village with the railway depot on about a west bearing, according to draft.

Town.—At Caimanera there are only a few houses and the railway terminus; the town of Guantánamo, 15 miles distant, is connected with it by a railway.

Fresh provisions, fruits, and vegetables can generally be obtained here.

There is a telegraph line to Santiago de Cuba. Steamers from Havana call trimonthly, and a semiweekly steamer to Santiago de Cuba.

The United States is represented by a consular agent at Guantánamo.

Light.—A lantern light is exhibited on each of the two angles of the mole head at Caimanera Harbor. The lights are elevated 16 feet above the sea. One lantern has two white and two red glasses; the other, two white and two green glasses, the colored glasses being turned towards the bay; the red light marks the northern, and the green light the southern angle, thus indicating the sides as well as the head of the mole.

The Coast from Guantánamo takes a westerly direction for about 20 miles to Berracos Point, which forms a remarkable round hill; it is clear of danger and may be approached to the distance of a mile. Thence it

trends northwesterly 5 miles, forming the bight of Cape Baxa (Low), and then resumes its westerly direction to the River Juragua, the entrance to which is about 8 miles from Berracos Point. To leeward of the bight of Cape Baxa there are three shallow sandy bays, separated by high scarped hills, called Los Altares, or The Altars, from the eastern one having a remarkable flattened summit, which are backed by the lofty mountains of Maestra.

From the River Juragua the coast continues westward for 9 miles to the entrance of Santiago de Cuba; between are the mouths of the Rivers Sardinero and Aguadores; in the vicinity of the latter several small houses are to be seen. All this part is bold and steep to, and may be freely approached to the distance of a mile. At 7 or 8 miles eastward of Santiago de Cuba a vessel can anchor in 17 fathoms water, off a valley or break in the land, 1½ miles from the shore. It has been reported that with the Morro Castle bearing between N. 45° W. (N. 47° W. mag.) and N. 5° E. (N. 3° E. mag.), distant one mile, there are 4 fathoms rocky bottom, and there is the same depth within 400 yards of the shore.

Nueva Salamanca, formerly Baiguiri, about 22 miles eastward of Santiago de Cuba, is the shipping port of some rich iron mines about 3 miles inland. A breakwater is in course of construction for the protection of the harbor. The ore is principally shipped to the United States.

Santiago de Cuba will admit vessels of the largest draft, entirely sheltered from all winds. Its locality is indicated from a distance by a remarkable valley, separating the eastern from the western spur of the Cobre Mountains.

The lofty mountain of Turquino is 56 miles west of Santiago, and in clear weather may be seen from the north coast of Jamaica. Gran Piedra, 5,000 feet high, is 20 miles to the eastward.

The Morro Castle, on the eastern side of the entrance, is a rather large terraced fortification, standing on the western extremity of a flat ridge about 200 feet high.

The entrance to the harbor is about 200 yards wide. After passing Smith Cay the channel widens, and, although the course is crooked, the sea breeze is generally a fair wind up to the city.

Light.—A lighthouse, built of iron, stands 100 yards eastward of the Morro Castle, and exhibits a white light, which shows a fixed bright light for 50 seconds and then flashing for 10 seconds, at 228 feet above the sea, and should be seen in clear weather 22 miles, but it can not always be depended upon.

Steam Tugs are in readiness to tow sailing vessels in or out of the port if required. Charges vary from $15 to $30 and should be fixed beforehand.

Diamante de Afuera Shoal, just to the west of the entrance, is probably laid down a little too far offshore. The pilots state that the sea in heavy weather breaks upon it. After passing the shoals a vessel may haul up for the city and anchor as convenient. The depth gradually decreases toward the northern part of the harbor.

Buoy and Beacons.—A red cylindrical buoy surmounted by a lattice-work pyramid, on which is a small vane, is moored on the extreme of Diamante Shoal in 30 feet of water, low spring tides.

A white post surmounted by a triangular-shaped vane marks the SW. extremity of Gorda Bank.

Colorado Shoal buoy is a cylindrical iron buoy, carrying a triangular pyramid, painted red and surmounted by a red vane marked with the figure 7 in white, indicating in feet the depth in which the buoy is moored.

Compadres Shoal buoy is a cylindrical iron buoy, carrying a tripod, surmounted by a spherical cage with a vane, on which is painted the number 14 in black on a white ground, indicating in feet the depth in which the buoy is moored. This buoy is painted white.

Directions.—When bound for Santiago de Cuba from the eastward, give the shore a berth of about 1½ or 2 miles to avoid the foul ground off the Morro, until Estrella Point comes open. When the latter bears N. 36° E. (N. 34° E. mag.), haul in upon this course, being careful not to bring it to the eastward of that bearing, and pass the Morro Point close aboard or at a distance of 50 yards, to avoid the ledge running off from the western point of entrance. Keep the eastern shore aboard until the Estrella is passed, then steer in mid channel between the shore and Smith Cay, on the south end of which there is a small village where pilots reside.

Having rounded the beacon off Gorda Point the beacon buoy will be seen on Colorado Shoal, in the middle of the channel, which must be kept to port; Gorda Point cliff south of it being clear of danger. Then steer along the eastern shore, which is steep-to, and pass to the southward and eastward of Ratones Cay, on which there is a magazine.

Having passed Ratones Cay steer about N. 13° E. (N. 11° E. mag.), passing westward of the beacon buoy on the Compadres, the outer of two small rocks (the inner one is 2 feet above water). Then haul up for the city, and anchor according to the vessel's draft, the depth decreasing gradually towards the upper part of the harbor. A vessel will have a good berth in 4 fathoms water, about ½ mile from the city, with Ratones Cay S. 39° W. (S. 37° W. mag.) and Blanca Battery, which is painted red, S. 54° E. (S. 56° E. mag). In leaving, it will be advisable to drop down to the entrance with the sea breeze on the previous evening, to be in readiness for the land wind on the following morning. Strangers should take a pilot.

A sailing vessel may enter the port as far as the outer anchorage with the wind from ESE., but to proceed to the city she must have the wind as far to the southward as SE. by E., in order to weather the Colorado Shoal. To leave the port, as she will have to haul up as far as SE. by E., between Smith Cay and Gaspar Point, the wind should be as far to the northward as NE. With very light winds vessels should not attempt to enter or leave the port under sail. In winter,

when NE. winds prevail, some days may elapse when vessels can not enter under sail, but there is generally during the daytime a breeze from SE.

During the rainy season the current in the channel at the entrance is very strong.

Pilots are efficient, not necessary for a man-of-war, but compulsory for merchant vessels. The following are the day (between sunrise and sunset) rates: Night rates double; for change of anchorage half rates are charged: Vessels of 100 tons and under, $9, and $1.50 additional for each additional 100 tons up to vessels of 500 tons; vessels from 501 to 700 tons, $16; 701 to 900 tons, $18; 901 to 1,000 tons, $20, and $2 additional for each additional 1,000 tons.

NOTE.—When a vessel is coming out a red and yellow flag is shown from the flagstaff to the eastward of the lighthouse. An incoming vessel must wait until the outgoing one is clear of the Morro, as the channel is too narrow for passing.

The City is quite large and is the oldest in the island, and is built on the NE. side of the harbor. Population, 45,000.

An iron pier 580 feet long has been built on wooden piles on the northern side of La Cruz Point. Deepest draft of water, 30 feet. A railway connects the iron-ore mines, 17 miles distant, with the pier, and vessels can load 3,000 tons a day. This pier is only adapted for loading ore. There are several other piers suitable for vessels of from 10 to 16 feet.

The place is healthy, but in summer yellow fever occurs. During the winter the temperature varies from 65° to 85°. The morning and afternoons are pleasant. Liberty should not be given here.

The authorities to be visited are governor of the province and the captain of the port.

There is a battery of nine guns, and salutes are returned.

The United States is represented by a consul and vice-consul.

Supplies.—Provisions of all kinds can be obtained. Fresh meat, from 10 to 20 cents per pound. Pipes are laid into the city from a reservoir of excellent water, supplied from streams on the hills. Costs 50 cents per barrel if taken from hydrant; 80 cents to $1, according to quantity, if delivered.

Coal, in large quantities, can be had from $8 to $9 per ton, brought off in lighters. Vessels of 12 feet can haul alongside the wharf northward of Cariviza to coal.

Dock.—There is reported to be docking facilities at Santiago for small craft. There is also a place for careening.

There are two good shops where ordinary repairs to steamers may be made.

Telegraph.—A telegraph cable connects Santiago de Cuba with Jamaica and the Windward Islands, and another laid along the south coast affords communication via Havana with the United States and Europe. A line also connects with all the principal ports on the island.

Communication.—The New York and Cuba steamship companies' steamers leave New York every two weeks for Cienfuegos, stopping going and returning. Time from New York, 5 days. There is frequent communication with Havana and other Cuban ports; also with the different islands.

Dues.—There are no tonnage or light dues. Signal dues, $4; health dues, $4.25; interpreting fees, $4.25; wharfage, $5 per day; custom-house fees, $10; bill of health, $2.50; labor, $2 per day; ballast, discharging, $1 per ton; lighterage, 8 cents per load of 200 pounds.

Tides.—It is high water, full and change, at Santiago de Cuba at 8h. 30m.; the rise is 2 feet.

Winds.—Within the port squalls are frequent between May and October, bringing much rain and wind, especially if they come from the NE.; they appear to rise in a great measure from local circumstances, inasmuch as off the coast, and even in the channel, they are less frequent. The land winds are constant during the night, weak from May until October, but fresh in the dry months, and northerly winds; sometimes they begin to blow at 9 p. m., at other times they do not commence until early morning, yet they almost always last until a little before the sea breeze sets in between 9 and 10 a. m. Between the two winds there is an interval of calm.

Sailing vessels should avoid running into the calm near the Morro, especially if there be much sea outside. From May till October storms from the SE. take place all along the coast, when the weather is so thick and dirty as to completely obscure it; during which it is dangerous to endeavor to make the port, as it is then difficult to recognize, and the sea is so heavy at the entrance as occasionally to close it.

The Coast from Santiago de Cuba takes a westerly direction for about 108 miles to Cape Cruz. The shore is bold, lofty, thickly wooded, and forms several bays and anchorages fit for small coasting vessels. The peak of Turquino, 8,400 feet high, rises a short distance inland about 50 miles westward of Santiago; and 37 miles farther on, and 15 miles eastward of Cape Cruz, there is another remarkable mountain, called the Ojo del Toro, 5,190 feet high, which, when seen from the WSW., forms two or three hummocks. Thence the range decreases in height, and falls by steps to the cape, which is low and woody, and near the extremity of the sandy point there are some huts and a flagstaff.

At 4 miles eastward of the cape the shore is composed of remarkable cliffs about 84 feet high, having horizontal strata resembling fortifications; but near the cape they are copper colored, and the strata become perpendicular.

Light.—A light, showing a red flash every 75 to 85 seconds, 113 feet above the sea, is exhibited from a lighthouse on Cape Cruz, and should be seen 17 miles. The tower is stone and the keeper's dwelling yellow.

Anchorage.—Soundings appear to extend to a short distance all along this part of the coast, and in moderate weather a vessel may

anchor in 6 or 7 fathoms of, water off the sandy beach at the foot of Turquino. To the westward of Portillo the depths are 12 to 6 fathoms at from 2 to 4 miles off shore. The soundings are irregular, varying suddenly from 6 to 3½ fathoms; but the bottom is easily seen, and there is no difficulty in picking out a sandy spot.

El Portillo, 24 miles east of Cape Cruz, is a harbor said to be accessible to vessels of large size. Good temporary anchorage will be found here for vessels of the heaviest draft. The locality may be known by three perpendicular white cliffs on the western side of the harbor, while the land on the eastern side is low and marshy. Both points of entrance are foul to a short distance, but the reefs which skirt them are steep-to and the sea breaks upon them. The interior of the harbor is obstructed by sand banks, which are generally marked out by stakes.

Directions.—At a distance of one mile from the land, after bringing the entrance to bear N. 20° W. (N. 23° W. mag.) vessels can stand in confidently, as there is no danger that does not show.

Shoal water extends a short distance from each point, but it can be readily seen from a ship's deck.

Vessels drawing 12 feet of water should anchor with the eastern point bearing S. 65° E. (S. 68° E. mag.) in about 5 fathoms of water. Vessels of less draft than 12 feet can proceed inside and find shelter from all winds, but the anchorage is confined. The outside anchorage would be uneasy and unsafe with winds from ESE. to south.

About 12 miles westward from Portillo there is said to be an excellent reef harbor, called Ensenada de Mora, for vessels of any size, with no dangers that are not apparent and easily avoided. It is at the foot of the Ojo del Toro Mountain, and, although no precise directions can be given for it, the knowledge of its existence might, in emergency, be useful.

Cape Cruz Reef, on which the sea breaks heavily, commences 1⅔ miles east of the cape, and extending to the westward terminates one mile SW. of it. There are often a number of fishing stakes on the reef, and its western extremity is frequently marked by a staff with a bunch of palm leaves upon it, placed there by the pilots. To the westward of the reef a bank with patches of 2½ and 3 fathoms of water on it extends 3 miles farther west and NW.

Good Anchorage will be found to the northward of the reef in 4 fathoms of water, with sandy bottom, with Cape Cruz bearing S. 50° E. (S. 53° E. mag.), Mount Ojo del Toro N. 79° E. (N. 76° E. mag.), and the extremity of the reef S. 11° E. (S. 14° E. mag.)

In coming from the eastward do not bring Ingles Point, 8 miles east of Cape Cruz, to the eastward of N. 79° E. (N. 76° E.) till Coloradas Point, the second point north of the cape, and of dark green color, comes open of Cacimba Point, to avoid the reef.

Pilots.—There are from 6 to 7 Government pilots, and care is taken that several of them remain at Cape Cruz so as to cause no delay. Pilotage is compulsory.

Caution.—Navigators must bear in mind that even the best charts give but an incorrect idea of the chain of cays, reefs, and shoals which extend 150 miles to the NW. from Cape Cruz. No good survey of this part of the coast has ever been made, and no materials exist for describing it correctly. A vast number of the cays are precisely alike, and the channels, when marked at all, are only marked by small bushes placed by the pilots, and which the first rough weather will wash away. There are doubtless deep navigable channels between the shoals, but they are only known to the pilots, who are very reticent and unwilling to communicate any information regarding them.

Limones River.—The entrance of the river, about 8 miles to the NE. of Cape Cruz, is bordered by two lines of reefs and has 5 feet least water. The river is navigable for boats to a distance of 3 miles, as far as the landing stage known as Marca de Limones.

Anchorage.—There is anchorage in 4 fathoms to the southward of Limones Cay, which lies N. 31° W. (N. 34° W. mag.) about 3½ miles from the entrance of the river, and is the largest and most westerly of the cays in the immediate neighborhood. The other cays are formed of mangrove trunks washed by the sea. There are two farms on Limones Cay.

Guanito Bay and Port Niguero, are two shallow ports north of Limones River; they are suitable only for vessels of light draft.

Manzanillo.—From Cape Cruz the coast takes a NE. direction for about 55 miles to the anchorage of Manzanillo. The population is 10,000. The United States is represented by a consular agent.

Manzanillo Bay lies between the mouth of the River Yara on the north and Caimanera Point on the south, 3 miles apart. The shores are low and covered with mangrove trees, and the water is shallow.

Gua Cays.—N. 22° W. (N. 25° W. mag.) of Gua Point are three cays of the same name, and between them and Gua Point there is a channel over a mud flat with a depth of 11 feet.

The Manzanillo Cays are a group of low islets, most of them covered with mangrove trees, affording a sheltered anchorage for large vessels, with deep water. In the middle of them there is a passage about 85 yards wide, with a depth of 7 to 11 fathoms.

There are three good careening places for large vessels with deep water, and well sheltered, in the middle of these islets.

Perla Cay is a short distance S. 45° W. (S. 42° W. mag.) of these cays, and is a small islet which forms with the Gua Cays a channel about 200 yards wide, with 7 fathoms of water, muddy bottom.

The great chain of shoals, cays, and reefs which skirt this part of the coast commences about 15 miles NE. of Cape Cruz, with the great bank of Buena Esperanza, and extends to the westward as far as Maria Aguilar Point, near Trinidad.

The usual approach to Manzanillo is by the Balandras Channel, a narrow passage carrying 18 feet of water between the small cays off

the SE. part of the Buena Esperanza Bank and the cays close to the Cuba Shore.

Proceeding to the NE. from the Balandras Channel, in 7 to 8 fathoms of water, the Manzanillo and Gua Cays will be seen, and the passage between them should be steered for.

Vessels of 27 feet can go up to Manzanillo, but the channels are narrow, intricate, and badly marked, and none of them should ever be attempted without the aid of a pilot. No tonnage or light dues are collected.

Pilotage.—Vessels up to 45 tons, $22 (Spanish gold); 45 to 60 tons, $26; 81 to 120 tons, $28; 121 to 150 tons, $32; 151 to 175 tons, $38; 176 to 200 tons, $42; 201 to 300 tons, $48; 301 to 400 tons, $52, and $5 additional for each additional 100 tons. For vessels of 600 tons and upwards, $67. Going to or leaving dock, day $3, night $6. Changing berth, day $2.50, night $5.

All vessels, no matter what their tonnage, which take pilots off Cape Cruz up to the passage of Cuatro Reales for the port of Santa Cruz del Sur, pay the maximum of pilotage, $67 Spanish gold.

Beacons—Nine wooden beacons, each showing 10 feet above high water, mark some of the dangers between Cape Cruz and Balandras Reef. White beacons each with a square top mark, are on the eastern side of the channels; and red beacons, each with a triangular top mark, point upwards, are on the western side.

Barcos Channel is a passage farther to the westward, leading to the anchorage of Manzanillo, but it is not well known except to the pilots.

Cauto River is 12 miles to the northward of Manzanillo. It is one of the deepest rivers in Cuba, and navigable for a distance of 60 miles. The bar carries about 6 feet water.

Tides.—It is high water, full and change, at Manzanillo, at 10h. 40m.; the rise is 2 or 3 feet. The water is highest during the months of September and October, with the wind from south and SW.

Bank.—The bank of soundings lying between Cape Cruz and the eastern end of the Doce Leguas Cays, 55 miles to the NW., is clear of danger, and vessels may stand in to 7 fathoms anywhere, except from about 8 miles N. 20° W. (N. 23° W. mag.) of the cape to the cay on the southern extremity of the bank of Buena Esperanza; within these limits it is not safe for vessels to go within the depth of 10 fathoms, as the ground is intersected with numerous rocky ridges, some of them nearly awash.

Buena Esperanza Bank.—From Balandras Channel, the white sand bank of Buena Esperanza takes a westerly direction for 10 miles to a small cay lying N. 8° W. (N. 11° W. mag.) 17 miles from Cape Cruz. Thence it trends in a northerly direction for 18 miles, and then bends to the WNW. 13 miles to Cuatro Reales Channel, which is the eastern passage to Santa Cruz, having formed in this last distance the two passages called Barcos and Pitajaya. The entrance of Cuatro Reales Channel bears N. 23° W. (N. 26° W. mag.) 42 miles from Cape Cruz, and about 14 miles from the mainland to the northward.

Santa Cruz.—The anchorage of Santa Cruz is accessible only to vessels of light draft. Vessels bound here should, from the western edge of the reef off Cape Cruz, steer a N. 15° W. (N. 18° W. mag.) course, which will lead up to a group of eleven small cays extending east and west, the two most westerly of which are the largest. The eastern cay is called Coiba, and is distinguished by some round-topped trees in its center. Immediately to windward of Coiba Cay is a remarkable sandy cay, and near it is another where the pilots reside.

The United States is represented by a consular agent.

The least depth of water in the Cuarto Reales Channel is 16 feet. The channel leading to Santa Cruz is narrow and crooked, but the water is so clear and the shoals so steep-to that the vessel may be easily guided by the eye.

Cuatro Reales Channel.—After passing Coiba Cay the course is N. 8° W. (N. 11° W. mag.), leaving on the starboard hand the Media Luna Cay and on the port hand the cluster called the Mordazo Cays, and on arriving abreast of the north point of these latter cays, steer to the westward, passing between the Mordazo Cays and the Carenero Cays near the coast, and carrying a depth of 3½ to 5½ fathoms of water over variable bottom.

The Carenero Cays, two in number, lie east of the entrance to the anchorage, and to the westward are two others, called Pinipiniche. From the anchorage the houses of the town bear from NE. to NW.

The Eastern Channel lies between the easternmost of the Doce Leguas Cays and an extensive bank, on the western part of which are the Uvero Cays.

To enter this channel from outside steer north, giving a berth of one mile to the reef which forms the eastern side of the channel. When abreast of the white sand bank, haul up N. 25° E. (N. 22° E. mag.) and pass through a group of three cays, leaving two of them to the eastward, and carrying a depth of 11 to 12 fathoms of water. After passing these three cays steer toward the easternmost of the Pilon, a group of four islets extending WNW. and ESE. When within one mile of this latter cay the Mate Channel will be seen, to enter which, bring the north point of the easternmost Pilon Cay to bear N. 55° W. (N. 58° W. mag.) and steer S. 55° E. (S. 58° E. mag.).

A better, because easier, course is to pass between the eastern Pilon Cay and the Mate Cays, and, rounding the latter to the northward, pass between them and the coast of Cuba. In both of these channels the depth is 16 feet.

To the eastward of the Mate Cays keep the coast aboard, carrying about 5½ fathoms of water till about ½ mile to the southward of the Pinipiniche Cays, when the town will be seen and anchorage will be found, as before stated.

Outside the cays the soundings are regular and vary from 8 to 20 fathoms. On the edge of the bank the bottom is generally rocky, but

inside of a depth of 10 fathoms vessels may anchor temporarily on sandy bottom.

Tides.—It is high water, full and change, at Santa Cruz at noon, and the rise is 4 feet; but the tides are greatly influenced by the strength of the wind.

Laberinto de Doce Leguas, or Twelve-League Labyrinth, is a range of low, bushy cays, with sandy beaches, extending in a WNW. and ESE. direction, 70 miles. They are steep-to; the lead is therefore no guide and in the night they should be given a wide berth. The easternmost islet, which lies N. 42° W. (N. 45° W. mag.) 56 miles from Cape Cruz, and Cay Breton, the westernmost, are 15 and 25 miles from the mainland, but in the center they are nearly 30 miles from the nearest shore. The space within, called the White Ground, from its clear, white sandy bottom, is studded with small islets, with deep water between them.

There are several channels leading through the outer cays for vessels of about 14-foot draft, but a pilot is necessary, and one may be obtained at Cape Cruz or from the Caiman turtling vessels, which are generally to be met with in the neighborhood. The principal openings are Eastern channel, at the extreme east end of the range; Caballones Channel, 38 miles to leeward of this, and Boca Grande, 22 miles farther; and being wide they can be easily recognised.

Bank inside the Laberinto de Doce Leguas.—This extensive tract has generally depths of from 5 to 12 fathoms, over a very soft white marly bottom, the mud from which almost always discolors the water and greatly adds to the dangers of the pilotage. The whole space is covered with groups of low cays, very inaccurately laid down on all charts, and their names are in much confusion.

There are several excellent harbors or lagoons formed by these cays, in which a hurricane might be weathered, but they can not be found without a pilot.

In many portions of this bank there are shoals of branch coral rising to the surface of the water from a depth of from 5 to 12 fathoms. By sending a boat ahead to sound a steamer may be navigated among them, but not without risk. From a point 5 miles north of the Boca Grande to within 10 miles of the Cuban Coast these dangers are very thick. The channel east of Burgado Cay is so full of these coral shoals as not to be fit for use.

Caballones Channel, or Boca de Caballones, is the easternmost of the channels through the Doce Leguas Cays for vessels larger than boats. It is easily recognized, being 2 miles wide, while none of the openings to the eastward have a greater width than ½ mile. At a distance of one mile to the westward of this channel is a cocoanut tree. Most of the trees on these cays are a sort of dwarf palm; the cocoanut is seldom seen. There are only 2¼ fathoms of water in this channel, and the same depth is found to the SW. of the entrance, from each side

of which reefs extend, narrowing the channel to 400 yards in width. No good marks can be given and the eye will be the best guide.

After passing this narrow place the depth of water increases to 9 and 10 fathoms.

The inside western point of the channel is called Black Mangrove Point and bears north (N. 3° W. mag.) of Pilot Point, the outer eastern one. This channel is one of the best fishing grounds on the south side of Cuba. An abundance of fish can be caught either by trolling or bottom fishing or by hauling a seine. The beach on the western side is also frequented by turtles.

Directions.—After entering, a north (N. 3° W. mag.) course will lead between Bergantin and Manuel Gomez Cays. The first of these lies 6 miles north of the east end of Caballones or Llana Cay, which forms the western side of the channel. From these cays a N. 8° W. (N. 11° W. mag.) course for 18 miles will carry the vessel up to the NE. end of the Yagua Reef, and from here a N. 43° W. (N. 46° W. mag.) course for 18 miles farther leads to the mouth of the River Jatibonico. The aid of a pilot will be necessary for a stranger.

Anchorage.—The best anchorage for small craft is one mile north of Pilot Point, with a depth of 2½ fathoms, sheltered from all winds except those from south to WNW., which are very rare. Should the wind come out from these unusual directions, a vessel can easily find shelter under one of the cays.

Pilots.—Some fishermen, who are always ready to act as pilots, live about ½ mile eastward of Pilot Point.

Palomas or Brigand Cay Anchorage is one of the best of the anchorages in this vicinity. It is 15 miles N. 8° W. (N. 11° W. mag.) of the Boca de Caballones. The outside anchorage is in a large bay formed by a semicircular chain of reefs and cays, and which may be entered from the north or west without danger. It is well sheltered from SW., round by south to NNE.

A good berth will be found ¾ mile N. 11° W. (N. 14° W. mag.) from a small sandy cay on the reef which joins the most western of the cays with the rest of the group. There are 7 fathoms of water, with good holding ground. If, however, a more sheltered anchorage is desired, it will be found in the lagoon inside, having an entrance open to the eastward, through which a depth of 3 fathoms may be carried. This inner anchorage is completely surrounded by reefs and cays, and lies in latitude 21° 06′ N., longitude 78° 56′ W. As the charts of this region are not at all trustworthy the cays surrounding this anchorage may or may not be the Palomas Group.

The Boca Grande is the most convenient channel of approach to the River Jatibonico. It is 3 miles wide and its depth is 2¼ fathoms, except within ½ mile of either shore. Cay Grande should be given a berth of 2 miles on account of a reef extending for 1½ miles to the southward off its western shore. This reef can be easily seen.

Having entered between the cays, the course is N. 31° E. (N. 28° E. mag.), which leads to windward of Rabihorcado and Burgado Cays. The depth in the channel ranges from 9 to 12 fathoms. The course lies to the westward of numerous coral heads, steep-to and easily seen from aloft. After passing Burgado Cay the course is N. 3° W. (N. 6° W. mag.) to the mouth of the Jatibonico River, where mahogany and cedar timber is shipped in large quantities. When the water is smooth the Boca Grande is a safe passage for vessels of 15 feet draft. The best track is west of the middle of the channel.

Anchorage.—There are two anchorages at the entrance to the Boca Grande, neither of them very good. The first one, with a depth of 4 to 7 fathoms of water, is in a bight formed by the reef in the eastern part of the channel, and lies one mile S. 17° W. (S. 14° W. mag.) of the western end of Cay Grande.

Here a vessel is better sheltered from the usual easterly winds than in any other part of the entrance, and the tide is not felt so strongly, but with the wind from the southward or westward it would not be a safe berth, and, moreover, a sailing vessel with these winds and a flood tide could not leave.

The other anchorage, with a depth of 2½ fathoms, is sheltered from west and NW. winds. It lies in the western part of the channel, about N. 70° E. (N. 67° E. mag.) of the south end of the Cinco Bolas Cays, and S. 8° W. (S. 5° W. mag.) of their NE. point. This anchorage is exposed to the entire force of the NE. wind and the sea, and a vessel lying here with these winds will have a dangerous reef right astern.

Tides and Winds.—The tides are very strong and variable, and a vessel should anchor during the night, which she can do in safety. The stream runs in and out of the Boca Grande at the rate of from one to 2½ knots. Near the mainland, in the early part of the morning, the wind is more northerly than at any other part of the day, and it draws round gradually with the sun; the land wind comes off soon after sunset.

Cay Breton should be rounded carefully on account of a reef extending from it 3½ miles to the SW. This reef is steep-to, and the sea generally breaks on it. Off the western end of the cay there is anchorage in 4½ fathoms, with the NW. end of the cay bearing N. 42° E. (N. 39° E. mag.) and the SE. end, S. 81° E. (S. 84° E. mag.).

Sailing vessels generally have to beat up to this anchorage, and in this case, after rounding the western end of the reef, the NW. end of the cay should not be brought to the southward of S. 70° E. (S. 73° E. mag.), nor on the other tack should the same point be brought to the northward of N. 59° E. (N. 56° E. mag.). This anchorage is sheltered from N. by E. to SW.

This is the most dangerous part of the coast, and is seldom without a wreck upon it; for although the reef is awash, there is often but little break to show it, and the apparent termination of the cays induces

strangers to haul close round, which at night is certain destruction. A vessel may haul round the extremity of the reef, and find good anchorage and shelter from all easterly and northerly winds; but in standing into a less depth than 4 fathoms keep a sharp lookout for rocky heads.

There is a passage through the reef to the NW. of Cay Breton with 2½ fathoms in it, but it is crooked, narrow, rocky, and known only to a few of the Caiman fishermen, who navigate it by the eye. There is a powerful indraught toward this passage on the flood, which frequently takes command of vessels passing the reef end too closely, where they are liable to be becalmed, and obliged to anchor in an exposed position.

Zarza de Fuera Cay.—From Cay Breton the reef takes a NNW. direction for 23 miles, and terminates ½ mile northward of Zarza de Fuera Cay, which is low, sandy, thickly wooded, and lies about 3 miles eastward of the NW. point of the reef, and about 8 miles from Zarza Point, the nearest part of the Cuba shore. The reef, without any cays upon it except an occasional dry patch of sand, is very steep-to in all parts, having 10 fathoms water alongside it, and 200 fathoms about a mile off; it trends from ½ mile off the north side of the cay to about 4 miles eastward of it.

A vessel should pass 4 miles westward of Zarza de Fuera Cay, and when it bears S. 87° E. (east mag.) if wishing to enter upon the bank, the vessel may be hauled up NE., the edge of the bank being quite clear for 9 miles, or within two miles of Machos de Fuera Cay. After striking soundings, the water will shoal almost immediately to 5 fathoms, and then deepen to 6 and 9 fathoms, with occasional patches of 4 fathoms as the vessel advances along the channel, which is quite clear between the mainland and Zara de Fuera Cay and that of Médanos de Manati, which latter marks the north extreme of the shoals extending from near the Boca Grande. The Médanos are very inaccurately laid down on all charts; their position should be in about 21° 27′ N., long. 79° 16′ W., and the coast of the mainland is laid down about 7 miles too far south, at least as far east as Pasabanao Point.

This part of the coast affords good shelter and holding ground and is without danger as long as the beach is in sight. Abreast of the Doce Leguas Cays the coast is low and marshy, producing quantities of tobacco, honey, wax, and mahogany, exported in vessels of not more than 15 feet draft from Santa Cruz and the River Jatibonico, the mouth of which lies 30 miles to the northward of the Boca Grande.

There is an inside channel between the ports of Santa Cruz and Trinidad, which is smooth and well sheltered, with numerous excellent anchorages. The assistance of a pilot is, however, indispensable.

The Coast between the River Jatibonico and Pasabanao Point, 6 miles westward, forms a bay in which there are 2½ and 3 fathoms water. From this point the coast trends WNW. 6 miles to Manati Point, and nearly midway between there is a small creek called Caobas, in which there are 6 feet of water. From thence to Tolete Point, 6 miles to the westward,

the shore forms a bight, near the center of which is the Estero Nuevo (New Creek).

At 8 miles south of Manati Point is the north end of the extensive bank, Médanos de Manati, and in the channel between the soundings are from 6 to 8 fathoms, the depths generally decreasing as the shore is approached. Between Tolete and Zarza Points, 4½ miles to the westward, the bight is a little deeper, and in the middle of it is the small shallow creek San Marcos.

Water.—Good water may be obtained about 3 miles up the River Jatibonico; and at Manati Point there are some wells, but the water is not so good.

River Zarza, which empties close on the east side of Zarza Point, is navigable for canoes for some distance, and communicates with the town of Sancti Espiritu, 26 miles inland. The water, however, is not fit for use until 24 miles from the mouth.

Two small cays lie about ¼ mile to the southward of Zarza Point, and a reef extends off them about a mile. Within the cays there is good shelter for small vessels in 3 fathoms, over a clay bottom. To the westward of Zarza Point is the creek of the same name, with a depth of 6 feet water, where small coasters find shelter from SE. winds.

Port Tunas, between Zarza Point and Caney Point, is a small bay with a depth of from 2¾ to 4½ fathoms, with a bottom of clay and weeds. Port Tunas is the seaport of the town of Sancti Spiritu, with which it is connected by a railroad.

Vessels bound to Tunas will find the Trinidad Range of mountains, which can be seen for a distance of 30 miles, a good landmark; also, the range of mountains to the eastward, separated from the Trinidad Range by low land.

When the eastern mountain, known as Loma de Banao, bears N. 8° E. (N. 5° E. mag.) it may be steered for, and the bank entered upon in 6 fathoms of water, 5 miles from Zarza de Fuera Cay and 8 miles from Marchas de Fuera Cay.

These cays are on the bank, are both low and covered with small trees and mangroves, and can be seen 8 or 10 miles.

The bank is clear of danger to within 4 miles of the southern or Zarza de Fuera Cay, and to within 2 miles of Marchas de Fuera Cay.

The soundings on the bank will be at first 6 and 7 fathoms, and then 5, 4, 6, 8, and 10 fathoms will be obtained, followed by a decrease to 5 and 4 fathoms until the port is reached. As the land is neared the harbor will be recognized by Blanco Zarza Cay, which lies to the westward of it, and the tall chimneys of the sugar mill on the coast eastward of the port.

Blanco Zarza Cay, lying 1¾ miles to the southward of Caney Point, is a small islet, with a lagoon in the center, covered with trees, and having a white sandy beach. A few huts are on the eastern end, where it is said pilots may be procured. It is foul SW. for a mile, SE. ¾ mile, and

NE. nearly a mile, leaving a passage between it and the shore ½ mile wide, with a depth of 3 fathoms. The cay lies about 8 miles NNW. of Zarza de Fuera Cay, and between them the depth is from 6 to 10 fathoms; but near the edge of the bank there is an isolated spot with 4 fathoms, within which a vessel will find good anchorage.

The cay makes two channels, both of which appear to be easy to navigate. The one to the northward of the island is the better, the deepest water being midway between the island and the mainland. Boats sounding in this channel got no less than 3 fathoms, and information was obtaided from the captain of the port and from the captains of trading vessels that this depth is carried by all who know the channel.

If pilots can not be obtained, strangers will find it advisable to send boats ahead to sound the channel.

Three miles N. 64° W. (N. 67° W. mag.) of Zarza Point is Caney Point, to the westward of which is a small creek with 6 feet water, and 6 miles farther to leeward is Ciego Point. In the bay between them these are from 3 to 5 fathoms water; and near the center is the River Tallabacoa, which has very little water in the dry season. Half a mile westward of Ciego Point is that of Iguanojo, with a ledge running off it for ½ mile.

Water.—There is a brook of good water a little westward of the River Tallabacoa. It will also be found fresh and fit for drinking about 3 miles above the mouth of the Iguanojo.

Tierra Cays.—From the River Iguanojo the shore takes a WNW. direction 4 miles, and then turns abruptly to the southward for 2 miles to Agabama Point. From the latter a narrow ledge extends off 6 miles to the SE., leaving between it and the Iguanojo, on the opposite shore, a deep bight called St. Pedro, in which there are from 3½ to 6 fathoms water, clay bottom.

From Agabama Point the Tierra Cays extend out to the distance of ½ mile; and 2¾ miles SSE. of these, and 2½ miles from the edge of the ledge, is Machos de Fuera Cay, having a reef extending from one to two miles eastward of it. At Agabama Point the river of the same name runs into the sea, but the water is not good until 18 miles from its mouth. The coast from Agabama Point as far as Casilda Point is covered with mangroves, very low and swampy; and from the latter to Guaurabo Point (or River) is of sand and steep rock.

Sierras de Sancti Spiritu are some high mountains 10 miles inland. Two of the peaks higher than the rest serve as useful landmarks. The northeasterly of these is called the Pan de Azucar, and may be recognized easily by its flattened summit. Loma de Banao, the other peak, lies 4 miles S. 45° W. (S. 42° W. mag.) of the Pan de Azucar. Four miles N. 20° W. (N. 23° W. mag.) of the City of Trinidad is another remarkable peak, called Pico del Potrerillo, which is visible 60 miles, also an excellent landmark.

The City of Trinidad is one of the most important on the south side of Cuba, having a population of 13,000. It is situated on high land, 3 miles from the sea, and about ½ mile from the left bank of the River Guaurabo, which is navigable only for boats. Imports and exports are landed and shipped at the harbors of Casilda and Masio, the former lying 2½ miles and the latter 4½ miles from the town.

The town lies on the slope of a remarkable saddle-shaped mountain, and in approaching from seaward a church, 700 feet above the sea, is a conspicuous object. When the mountain behind the town is seen from the west or SW. it has the shape of a gun quoin, and can be seen at a distance of 30 miles.

There are no tugboats; the cargo is landed by lighters.

The United States is represented by a consular agent.

Port Charges.—The pilotage depends on size and rig. Bark or three-masted schooner, $32; brig or schooner, $26; customhouse fees, in and out, about $8; interpreter's fees, about $4; bill of health, $2.50; lighterage on coal, $1 per ton; discharging ballast, 75 cents per ton; labor, $1.50 per day; tonnage dues and general regulations are the same for all ports of Cuba. Coal can be had for $8.50 to $9 per ton; there is generally about 900 tons on hand.

Ports of Trinidad.—From Agamaba Point to Maria Aguilar Point, 9 miles N. 76° W. (N. 79° W. mag.) of it, and 3½ miles SSE. of the mouth of the Guaurabo, the shore is deeply indented, forming four small inlets. Jobabo Bay, the easternmost, is only fit for coasters; Caballones, the next, has a depth of from 3 to 4 fathoms; Port Masio has a greater depth than the others; and Port Casilda, the westernmost, has from 2¾ to 4 fathoms, muddy bottom. The shore is skirted by numerous cays, reefs, and banks, to the distance of from 2 to 3 miles, and the channels, although deep, are so intricate that a pilot is absolutely necessary. The weathermost channel lies between Machos de Fuera Cay and a small narrow ledge about ½ mile to the westward of it, and has a depth of 3 fathoms, but it is by no means to be recommended, and the sand banks are not stationary.

At 2½ miles to the westward of Machos Cay is Puga Cay, almost level with the sea, which sometimes breaks over it. Tall mangrove trees have grown on this cay, rendering it somewhat conspicuous.

Blanco Cay.—The shores of this cay, as its name imports, are formed of white rock and sand. It is a small low islet, 22 feet high, covered with trees and with a lagoon in its center. When seen from the southwestward this cay seems wedge-shaped, the higher part being to the southeastward. In case of having to wait for a pilot, as is probable, anchorage in 9¼ fathoms may be had with the city of Trinidad bearing N. 34° W. (N. 37° W. mag.) and Blanco Cay bearing N. 48° E. (N. 45° E. mag.) distant one mile. Before anchoring a clear spot should be selected.

If bound for Trinidad, after passing Zarza de Fuera Cay, instead of

entering on the bank of soundings, steer about N. 23° W. (N. 26° W. mag.) and after sighting Machos de Fuera Cay, keep away N. 65° W. (N. 68° W. mag.) for Blanco Cay. When the Pan de Azucar is on with the Loma de Banao, Machos de Fuera Cay will bear north (N. 3° W. mag.) The knowledge of this fact may assist a stranger to recognize the land.

To seaward these reefs are steep-to, and 5 fathoms will be found close up to Blanco Cay, but a reef extends 600 yards from its western extremity, which may be safely rounded by the eye, and anchorage and good shelter found in 3 fathoms to the NW. of the cay. There is no safe opening westward, except for coasters drawing under 12 feet.

Port Masio, of the ports of Trinidad, will be found the most convenient for a sailing vessel, as it can be entered and left with the prevailing winds. Neither this harbor, nor Port Casilda, is suitable for vessels drawing more than 15 or 16 feet. For larger vessels the best anchorage will be found in from 3 to 4 fathoms of water, with Blanco Cay bearing S. 82° W. (S. 79° W. mag.) and Puga Cay S. 8° E. (S. 11° E. mag.).

In entering either port the shoals, in clear weather, can generally be seen from aloft. To enter Port Masio take the channel between Blanco Cay and the reef off Puga Cay. The eastern end of the former cay should be passed at ¼ mile distance. After passing these cays, if obliged to wait for a pilot, good anchorage will be found, with Blanco Cay bearing N. 87° W. (west mag.) in 3 or 4 fathoms of water.

If intending to proceed without a pilot bring the southern end of Blanco Cay to bear west (S. 87° W. mag.) and the middle of Puga Cay to bear S. 34° E. (S. 37° E. mag.) and from this point steer N. 40° W. (N. 43° W. mag.). This will lead between the ledge off the NE. end of Blanco Cay, on the port hand, and Cascajal Reef nearly awash on the starboard hand.

Jobabo Point may be known by a sandy beach on it, and as soon as it bears north (N. 3° W. mag.) haul up N. 20° W. (N. 23° W. mag.) steering for the western point of entrance of Port Masio, avoiding by the eye the shoals on either side. In standing in toward the middle of the harbor it is only necessary to keep clear of a shoal extending from the landing place on the west side. In standing in for Port Masio, the small bays of Jobabo and Caballones will be left on the starboard hand. To enter these bays it is only necessary to keep half way between the points of entrance, anchoring in 2½ or 3 fathoms of water, mud bottom.

Port Casilda.—There are three channels: The first east of Blanco Cay; second, west of the same cay; and the third, the Mulatas Channel, close to the eastward reef of that name.

Merchant vessels are obliged to take a pilot at Blanco Cay. If not able to obtain a pilot, a boat should be sent ahead to sound before attempting any of the passages.

The Anchorage is in from 16 to 25 feet of water, mud bottom.

Caution.—The stakes marking the channel are frequently changed by the pilots, to keep strangers from learning the pilotage.

Mulatas Channel is shorter than the one just described, and it is said to have a depth of 15 feet, but the aid of a pilot is necessary.

Casilda Harbor is only 800 yards wide, and although it is 2 miles nearer Trinidad than Port Masio a vessel will have to send to the Guaurabo River for water. There are other channels leading to Casilda, but they are somewhat foul, and there are no good leading marks for them. The assistance of a pilot is therefore necessary.

A vessel proceeding to this port should obtain a pilot at Blanco Cay; as the approaches from seaward are narrow and tortuous. If it should be necessary to heave-to outside for a pilot, the port should not be brought to the eastward of N. 70° E. (N. 67° E. mag.) in order to avoid the Mulatas Reefs, extending to the westward of the port.

Tugboats can generally be obtained to assist vessels in calms and light head winds.

Coal.—A small supply may be obtained at times.

Tides.—The tides in the channels run to the SW. and NE., with a strength of ½ mile an hour, rising and falling 1½ feet, but after a SE. wind the rise and fall is 3 feet.

Guaurabo Anchorage.—If it is only desired to communicate with the town of Trinidad, a conveniently accessible anchorage will be found at the mouth of the River Guaurabo, 3 miles to the westward of the town. This anchorage is, however, entirely open to the SW. To enter it, keep on to the NW., past the entrance to the Mulatas Channel, and, after hauling around Point Maria Aguilar, keep close along the shore till the town bears about east, when the bay will open out. Cirioles Point, the southern limit of the bay, should be passed at a distance of 300 yards, and a good berth will be found in 8 fathoms with this point bearing S. 3° W. (south mag.).

Although the bay appears roomy, there is only room for one vessel, the bottom being strewed with rocks, on some of which there is only 6 feet of water. This place will be found a convenient anchorage for communicating with Trinidad, as it will be only necessary to pull 3 miles up the river as far as a bridge which lies only ¾ mile from town.

Paz Bank is pear shaped, 10 miles long in a WNW. and ESE. direction, and 3½ miles wide at its broad end, which is to the eastward; this part is sandy, and in moderate weather a vessel may anchor on it. The general depth on the bank is from 12 to 20 fathoms, and towards the NW. end it is rocky.

The Coast from the River Guaurabo runs about W. by N. for 8 miles to Muño Point, west of the River Hondo; thence a little more northerly for 9 miles farther to San Juan Point, one mile beyond which is the mouth of the River Guayximico. It is of steep rocky cliffs, and the land mountainous as far as a little westward of San Juan Point, where the chain named Trinidad terminates. It is all along clear of danger

with the exception of a reef extending off less than ½ mile, between the mouths of the Rivers Yaguanabo and San Juan, and may be approached to a distance of 3 miles. Between are the Rivers Guanayara, Cabagan, Hondo, Yaguanabo, and San Juan, which coasters of 6 feet draft can enter. Water may be obtained from these rivers about 3 miles up.

From the Guayximico the coast trends northwestward for 14 miles to Colorados Point, which may be approached to the distance of 100 yards. The land is flat, and, between, the Rivers Gavilan, Gavilancito, and Arimao run into the sea, but they are of no importance. From Port Xagua the coast runs nearly west for 21 miles to Caleta Buena (Good Cove), Point thence it trends a little northward for 7 miles farther to Oriental, the east point of Cochinos Bay.

Port Xagua or Cienfuegos is quite secure in all winds, with a depth sufficient for vessels of the heaviest draft; but its channel is so narrow and tortuous and the tides are so strong that it is very diffcult to navigate. The entrance, between Colorados Point on the east and Sabanilla or Vigia Point on the west, is 1¼ mile wide (the bank fringing the coast on the western side of entrance to this port extends from the shore about 200 yards, at midway between Sabanilla Point and Angeles Castle); but 2 miles within, between Pasacaballos and Angeles Points, it is narrowed to little more than 200 yards across, and here takes a sharp turn from NW. to NNE., carrying the same breadth for ¾ mile to Milpa Point on the east, at the inner end of the channel, when it opens out into a large harbor.

Town.—The town of Ferdinanda de Xagua, or Cienfuegos, is built on a peninsula on the eastern side of the bay. Population, 23,000. This peninsula separates two large bays, each affording excellent anchorage.

Vessels discharge into lighters till their draft is reduced to 14 feet, when they can haul alongside of the wharf.

The sanitary condition is good, the city being clean. There is a health officer, who boards all vessels. Quarantine is not very strict and rarely lasts more than a day or two. The public hospital is under government control and accommodates 250 patients. Foreigners are charged $2 per day. A doctor is in charge, assisted by a corps of trained nurses. There is also a small private hospital.

The United States is represented by a consul and vice-consul. Authorities to visit are the military governor and captain of the port.

Light.—On Colorados Point, from a tower 45 feet high, a fixed and flashing light, every 2 minutes, is shown, visible 14 miles.

Supplies.—The market for fresh provisions is good and the price fair, large quantities of salt provisions being kept on hand.

River water can be obtained from water boats, 1½ cents a gallon. There are pipes at the wharves, where water can be obtained by boats.

Coal.—There is an extensive coal yard, where a large supply of coal is kept at a cost of $8 to $8.75 per ton. Small vessels can coal at the wharf; large vessels lie almost ½ mile off.

Docks.—There are two slips, where vessels 200 feet long, drawing 8 feet forward, 12 feet aft, may be hauled up. Also two machine shops, where steamers may repair.

Steamers.—Ward's line from United States call twice a month during the busy season, and once a month during the rest of the year. Atkins line from Boston call once a month, only during the busy season; also coast line, Spanish.

Telegraph.—A land line to Havana; also a cable—the West India Telegraph Company.

Mail is received twice a month by steamer and twice a week by rail from Havana. A railroad runs between this place and Havana.

Pilots are under the control of the captain of the port and are reliable. Pilotage is compulsory, except to vessels under 80 tons. Vessels coming into port or going out at night between sunset and one hour before sunrise pay double pilotage. Pilotage fees on foreign vessels in and out: For vessels of from 81 to 100 tons, $11 (Spanish gold); 101 to 150, $13; 151 to 200, $14; 201 to 250, $15; 251 to 300, $17; 301 to 350, $19; 351 to 400, $21; 401 to 450, $23; and for each additional 50 tons up to 4,501 tons, $1. For vessels of from 4,501 to 5,000 tons, $38; over 5,000 tons, $40. For removals in the harbor from anchorages to moles or between moles, the pilotage varies from $\frac{1}{3}$ to $\frac{2}{3}$ of the actual pilotage for coming in and going out.

Mooring and unmooring on all foreign vessels exceeding 80 tons is compulsory and varies from 87½ cents on 100 tons to $3.15 (Spanish gold) on 5,001 tons and over.

Towage.—For vessels of from 100 to 200 tons, $30 (Spanish gold), and $10 for each additional 100 tons or fraction thereof.

The charges on a vessel of 360 tons is: Pilotage, $42; towage, $100; watchman, $3; interpreter, $2. Vessels of more than 500 tons pay $4 for watchman.

Directions.—In entering the harbor of Cienfuegos give the shore east of Colorados point a berth of one mile, but the point itself may be passed within 500 yards. Then keep in mid-channel all the way to where the shores separate to form the bay. The eastern interior point is called Point Milpa, and off it a spit extends for ¼ mile, with 8 feet of water on it. North of Point Milpa is the bank of the same name, to avoid which steer for the SE. end of Carenas Cay as soon as Milpa Point is abeam. When the north point of Alcatraz Cay bears east (N. 86° E mag.), Milpa Bank is passed, and the vessel may anchor, if desirable, in 7 or 10 fathoms of water.

If intending to proceed farther, Carenas Cay should be passed on the starboard hand, as a long spit connects it with the northern shore. The assistance of a pilot will be necessary, as, although the edges of the banks or shoal are generally marked by stakes or buoys, they are liable to be changed and cannot be depended upon.

Tides.—It is high water, full and change, at Port Xagua, at 4h. 57m., and the rise is 2 feet.

Caution.—As the current runs about three knots, vessels going with the tide must be particularly careful in rounding Pasacaballos Point, as they are apt to be swept on the opposite shore. The banks are reported as extending.

Xagua Bank is of coral formation, 3 miles in length, east and west, and about 2 in breadth; at its NE. end there is a shoal patch with only 2 fathoms water on it. The northern edge of the bank is steep-to, shoaling suddenly from no bottom with 30 fathoms line to 12 fathoms, and then to 4 fathoms, which depth is near the shoal patch, making it at all times dangerous when approaching from the northward; whereas when nearing it from the southward the discolored water will not only be seen, but the soundings will decrease gradually from 17 to 9 fathoms, which is the least depth a vessel should stand into. The bottom is hard, and not good holding ground. From the shoal patch, the peak of St. Juan bears N. 49° E. (N. 45° E. mag.)

Cochinos Bay.—The eastern shore is formed by soboruco rocks and steep-to. Half a mile from the northern extremity of the bay there are 14½ fathoms of water, with a bottom of rock and sand, the depth rapidly diminishing toward the beach. On the western shore there are sand-beaches, with a narrow bank of soundings and rocky bottom. In the northern part of the bay there is a landing place, but no good anchorage, as the bottom is rocky.

The Gulf of Batabano, between Padre Point and Mangle Point, a distance of 160 miles, is bordered on the south side by the Bank of the Jardines and Jardinillos, the Isle of Pines, and the islands known as the Mangles, Indian and San Felipe Groups. To the northward of these groups are almost innumerable cays and sand banks, as yet very imperfectly known and forming numerous and intricate channels. To navigate these channels and to identify the cays used as landmarks local knowledge is positively necessary. The principal channels leading to the road of Batabano are: From the eastward, the Gordas Channel, between the mainland and the Juan Luis Cays; from the southward, the Rosario Channel, along the western edge of the Jardinillos Bank; and from the SW. the channel between the Isle of Pines and the Indian Cays, between the Indian and San Felipe Cays, and between the latter group and the mainland.

Pilots and masters of steamships running constantly to Batabano have asserted that vessels drawing 11 feet can go there with safety.

Pilots may be obtained at Cienfuegos or at the Isle of Pines.

Piedras Reef and Cay.—From Padre Point, which is low, a coral reef extends SE. for nearly seven miles, where it terminates at Piedras Cay, which is small and low. The reef is steep-to and has several narrow cuts leading onto the bank, through which 15 to 22 feet may be carried. The best channel is just to the northward of the cay, but as nothing would be gained it will be better always to pass outside the cay. The edge of the bank takes a W. ½ N. direction, and 13 miles

from the cay is Las Lavandéras shoal, which is 2 miles in length, and lies 1½ miles southward of the east end of Blanco Cay.

The shore from Padre Point westward, as far as Cristobal Point, a distance of 35 miles, is very low, swampy, and skirted by numerous mangrove cays. Blanco Cay, the largest of these, is 10 miles long ESE. and WNW., and its west end is 15 miles from Padre Point. The south shore of this cay is of sand, and at the east end water may be obtained by digging wells.

Light.—On the northern part of Piedras Cay, a fixed white light is exhibited from above the keeper's dwelling, which is brown; it is 28 feet above the sea, and may be seen in clear weather 9 miles.

Cazones Bay.—The shore from abreast the west end of Blanco Cay recedes, forming a large bight in a NW. by W. direction, 7 miles deep, named Cazones Bay, which is shallow. The western side is formed by low mangrove cays terminating in Diego Perez Cay, 6 miles west of Blanco Cay. On the northern end of Diego Perez Cay there are some natural wells of good water. Fish and game are abundant.

Gulf of Cazones, between the NE. edge of the Jardinillos Bank on the south, and Piedras and other cays and reefs on the north, is dangerous for sailing vessels to cross, as they will be liable to calms and cross currents.

Diego Perez Channel.—Between the south end of Diego Perez Cay and the north end of the Jardinillos Bank is a channel carrying 10 feet water, which leads to the bank westward and to Batabano. About 2 miles WSW. of the south point of Diego Perez Cay is the south end of Flamenco Cay, and thence a chain of low cays ranges in a WNW. direction for 12½ miles, becoming nearly connected to the shore at Cristobal Point. The water between the cays is shallow.

Light.—A light is exhibited from a lightvessel placed southeastward of Diego Perez Cay. The light is fixed white, 43 feet above the sea, and should be seen 12 miles; the vessel is painted black, with a white streak, and Diego Perez painted on her sides. Vessels entering Cazones Bay should leave the lightvessel on the port hand. Those proceeding to the westward should leave her on the starboard hand.

Bonito, Cacao, and Palanca Cays, the most southern of this chain, are the guides for vessels through the channel, which has not more than 10 feet water, fine white sand, but there are scattered patches of rock easily seen, with less than 6 feet on them. The south side of the channel is here bounded by the north extreme of the Jardinillos Bank and the Rabihorcado Cay.

Fábrica and Cristobal Groups.—Palanca Cay, which is rather more than 12½ miles WNW. of Flamenco Cay, is followed by the Fabrica Group, which connect themselves with the shore to the NE. and form a channel with the chain of the Cristobal Group westward of them.

Cristobal Point lies NNW. 6 miles from Palanca Cay. From this point the low swampy coast trends nearly WNW. for about 20 miles to the small cay at the entrance to the little bay of Malahambre.

Juan Luis Cays.—This part of the coast is known as the sabanas, or plains, of Juan Luis; and off it, at a distance of from 5 to 7 miles, is a chain of mangrove cays and sand banks of the same name. Vessels under 9 feet draft can pass between them and the coast, and also between them and the western cays of Cristobal. About 4 miles NW. of Malahambre Cay is Gorda Point; the intervening land is marshy, covered with a herb called masio, and there are some palms a short distance inland. There are numerous channels for small vessels among the numerous cays along this coast and between them and the shore, but there are no leading marks which a stranger could recognize, nor does any intelligible and accurate information regarding them exist. The numerous large steamers running along the south coast of Cuba from Batabano to Cienfuegos and Santiago de Cuba are all furnished with skillful pilots, but no general information can be procured from them respecting the navigation.

Broa Bay.—From Gorda Point the shore takes a NNE. and NE. direction for a short distance, and then trends to the eastward for about 14 miles, when it bends round to the north and NW., forming the bay of Broa, which, between Gorda and Mayabeque Points, northward of it, is 16 miles wide, and carries a depth of from 3 to 4 fathoms. The shores of this bay are submerged and covered with mangroves; at its head the River Jatibonico empties itself, and on the north shore several others run into the sea.

At 11 miles to the NW. of the River Jatibonico is the loading place of Caimito, which is much frequented. There are 13 feet water, mud, a long ½ mile south of the pier. At 8 miles westward of the pier is the loading place of Rosario, which has a tower and also a pier, and ½ mile south of the latter there are 11 feet water, mud. Both these anchorages afford shelter at all times except in the season of the SE. winds.

Water.—At 4 miles WSW. of Rosario is Mayabeque Point; and 1½ miles NW. of it is the mouth of the River Mayabeque, where there is always good water.

Batabano is 9 miles to the westward of the River Mayabeque and is a place of constantly growing importance, as the port through which nearly all the communication of Havana with the southern coast of the island takes place. A railway runs to Havana, time two hours, and the submarine telegraph cable is here connected with Havana by land lines.

The channels leading to this port only admit the passage of vessels drawing 12 or 13 feet of water, and the anchorage is entirely exposed to SE. winds. There are but few scattered buildings on the shore, the town of Batabano lying 3 miles inland.

Lights.—A fixed white light is shown from a mast and is visible 4 miles. At the end of the railroad company's dock is another light, fixed white, visible 6 miles.

Cayamas Point.—From Batabano the coast runs westward for 15 miles to Cayamas Point; between are Cagio Point and River, where the

vessels at Batabano often obtain water. This river empties itself through the marshes, and the anchorage off it, with 2¼ and 2¾ fathoms water, is sheltered from all winds by the chain of cays in front of it. The marshy ground from the mouth of the river to the firm land is more extensive than that between Batabano and Mayabeque, yet its environs are more cultivated.

Batabano Channels.—Cayamas Point forms with the chain of cays southward of it the channel of the same name, in which there are only 6½ feet water. These cays run in a SSE. direction for 11 miles, where they form, with another chain extending 13 miles eastward, the channel of Hacha, with 7½ feet water in it, which is much frequented by small vessels leaving Batabano or proceeding to it westward of the Isle of Pines and San Felipe Cays.

Cruz Cay, the eastern of the latter chain, lies nearly S. 10° E. (S. 14° E. mag.), 15 miles from Batabano, and at a little distance westward of it is Redondo Cay, under the lee of which small vessels find shelter from the strong SE. winds, from July until October, to which the whole coast is exposed.

At 6 miles southward of Cruz Cay is Monterey Cay, forming a channel between with 2¼ fathoms water, mud bottom. This channel is the widest of these which afford a passage to vessels to or from Caimito, Rosario, and Batabano. From Monterey a ridge of rocks extends to the SW. for 8 miles. When westward of this reef, the several heads of rocks southward of the cays on the north side of the channel should be avoided.

Directions to Batabano.—If bound to Batabano through the Gulf of Cazones, steer up the gulf so as to make Diego Perez Cay on the port bow. Skirt the reef until the south part of this cay bears about N. 75° W. (N. 79° W. mag.), when a vessel may haul round the dry point of the reef and steer for the south part of the cay, and with a good lookout she will not have less than 10 feet water. Give the end of Diego Perez Cay a berth of about ¾ mile, leaving the lightvessel on the starboard hand, and the water will deepen to 2 and 3 fathoms, but with an irregular bottom and rocks in all directions. When abreast of Diego Perez steer to pass 600 yards from Flamenco Cay; a greater distance off is unsafe.

After passing Flamenco Cay, steer to pass midway between Rabihorcado Cay on the port bow, and Bonito Cay and the rest of the range of cays on the starboard. A depth of 3 and 4 fathoms will be carried on this course, but when abreast of Rabihorcado the water will rapidly shoal to 9 feet, over a white, sandy bottom and occasional patches of rock which are easily distinguished. The latter depth will be carried for about 12 miles, on a N. 86° W. (west mag.) course, when it will gradually deepen to 2½ and 3 fathoms, with the same white bottom and patches of rocks.

Gordas Channel.—In a vessel of not more than 8 feet draft, this

channel may be advantageously taken, in preference to going round the rocky spit which projects 7 or 8 miles to the southward from Monterey Cay. To enter this channel, when the south end of Ambar Cay on the NW. side of the channel bears N. 41° W. (N. 45° W. mag.), distant ¾ mile, steer about N. 26° E. (N. 22° E. mag.), keeping Ambar Cay about ½ mile on the port hand, and taking the precaution of having a boat sounding ahead, so as not to come into a less depth than 9 feet, soft mud.

The water will soon deepen to 2 and 2½ fathoms, and a course can be shaped for Batabano. Give Cruz Cay a wide berth in passing, as the depths near it are not known. There are no dangers between Gorda Point and Batabano, but regular soundings of 2½ and 3 fathoms; the distance, however, 19 miles, appears to be over represented on the charts, and at night not more than 12 miles should be allowed as the run between.

Towards Batabano the soundings will decrease slowly and regularly. The anchorage is open to the southward, and may be recognized by a pier projecting about 400 yards from the mangrove shore. At 200 yards from the pier head the depth is 10 feet.

Hacha Channel.—Bound to Batabano from the westward of the Isle of Pines, from a position 2 miles westward of Dios Cay, in 2½ fathoms water, steer N. 38° E. (N. 34° E. mag.) carrying about 3 fathoms, until the Guanima Cays are sighted, which, with all the cays in their locality, are so exceedingly low as to often cause great perplexity. When these cays are made out, the water will shoal to 2½ fathoms, when steer N. 71° E. (N. 67° E. mag.) until 2 or 3 miles northward of the Petatillos Bank, which runs east and west. Run along this shoal at that distance, carrying 2½ and 3 fathoms, until Culebra Cay bears S. 38° W. (S. 34° W. mag.) when the Hacha Channel will open out, bearing N. 38° E. (N. 34° E. mag.).

Steer directly for the passage, and in running through take care to avoid the mud bank on its eastern side; navigate it with a boat ahead, keeping nearer the western shore than the eastern, and 9 feet will be carried over soft mud. When clear of the channel, a course can be shaped for Batabano.

Majana Bay and Sabana-la-mar.—From Cayamas Point the shore takes a W. ½ N. direction for 9 miles, when it trends to the SW. for 8 miles to Point Salinas, forming Majana Bay. The River Guanima empties itself westward of Cayamas Point, and about here the marshes terminate. From Salinas Point the coast trends SW. 6 miles to Capitana Point, and then about SSW. 4 miles to the small creek of Sabana-la-mar, which affords shelter to droghers, near the mouth of the Cristobal River.

The Coast from the entrance to Sabana-la-mar runs nearly SW. by W. for 6 miles, to the entrance of the River Rancho, and then S. by W. 11 miles to Carraguco Point; in this space are the creeks or inlets of

Guasimal, Bacunagua, and others of little importance; off this part of the coast shoal water extends for nearly 7 miles. About 6 miles west of Carraguco Point is the entrance to the River San Diego, and 4 miles SSW. of the latter is Gato Point, near which the Rivers Convento and Hondo join the sea, forming inlets. About 5 miles SW. of Gato Point is Gaspas Point, and 8 miles farther is Fisga Point, off which a shoal of 3½ fathoms extends southward about 3 miles.

Calonna Point and River.—From Fisga Point the marshy shore trends WNW. 4 miles to Calonna Point, and then about NW. 4 miles, forming a bay, at the head of which the River Calonna empties itself.

From the former point a reef skirts the shore, the southern edge of which is 1½ miles off Calonna Point; 2 miles westward it forms a channel 1¼ fathoms deep, by which the mouth of the Calonna is reached, one of the loading places of Pinár del Rio. From the Calonna River the coast runs about SSW. 4 miles and then W. by S. 4 more to St. Domingo Point, and thence west 9 miles to the mouth of the River Galafre.

Cortes Bay.—From the mouth of the Galafre the coast trends SSW. 7 miles to the entrance of the River Cuyaguatege. About 4 miles southward of the latter are four small cays, which extend 2⅛ miles in a southerly direction, covering the mouth of a deep bay, called the Laguna de Cortés. In this lagoon there are 2½ fathoms water, but at the narrow entrances formed by the cays there are only 6 feet. Turtle are found on the cays. Piedras Point, which is on the parallel of San Felipe Cays and distant from them about 19 miles, is the termination of Cortes Bay, where there are from 3 to 3¾ fathoms water over weeds.

Mangle Point.—A rocky ledge extends off Piedras Point for some distance, having 15 feet water on it, and near the point are some rocks on which the sea breaks; at 2½ miles S. 24° E. (S. 28° E. mag.) of the point the depths increase to 5 fathoms, rocky bottom. From Piedras Point, the coast, bordered by a bank, trends SSW. for 8 miles to Cape Frances, and thence SW. by W. 5 miles to Mangle Point. This point is low, and there is nothing to mark it except the bend of the coast and a fisherman's hut west of it on a small sandy beach. It is skirted by a reef which extends off 400 yards, and is steep-to.

Before proceeding farther with the description of the coast we will give a general description of the shoals, cays, etc., lying south of Batabano.

It is but very seldom that a man-of-war or a merchant vessel needs any description of this neighborhood, and it must be remembered that no correct and complete survey has ever been made here.

Bank of the Jardines and Jardinillos.—The NE. part of the reef which encircles the great bank and cays of the Jardines commences southeastward of Diego Perez Cay, and running to the SE. forms an inward curve at the Médano Vizcaino Cay, and thence continues to the eastern cay of the bank; this side of the bank is steep-to, studded with rocks

and small patches of sand just awash, with no opening. The mariner is again warned that the current in the Gulf of Cazones is uncertain, both in strength and direction, and he can not be too cautious.

East Guano Cay is of soboruco, about 40 feet high, the east end covered with grass, dwarf cactus, and shrubs; elsewhere the ground is rough, with deep pits from the excavations for guano. A small rock lies about 200 yards from the east end of the cay, and shallow uneven ground extends ½ mile N. 71° E. (N. 67° E. mag.) from it. The bank, about 5 miles in breadth, extends in an ESE. direction from the cay, and terminates about 11 miles from it, where there are 14 fathoms water. From this depth the soundings gradually decrease towards the cay, with a bottom of coral, sand, and weed.

From East Guano Cay the edge of the Jardines Bank runs to the westward for 12 miles to Trabuco Cay. Thence the cays continue to Largo Cay, 13 miles to the westward, and are generally of rock, high and steep, and lie near the edge of the bank, which is skirted by a chain of reefs.

Largo Cay, 12 miles in length, is the most eastern of the Jardines, which name comprises all the cays between it and Isle of Pines. It is uniform, about 50 feet high, thickly wooded, and on its south side is a sandy shore, bordered by a reef which at its east end extends more than a mile off. About 5 miles S. 15° W. (S. 11° W. mag.) of the NE. point lies a dangerous reef about 3 miles from the shore, and just within the edge of the bank, on which the sea breaks. The reef which skirts the south side of this cay runs about W. by S. for 12 miles, and then trends to the southward for about 6 miles, forming a spit nearly 2 miles wide, at the outer extreme of which is supposed to lie Jack Taylor Shoal. From the northern end of the spit the main reef continues to the westward for 5 miles, as far as Rosario Channel, with deep water close to the southward of it.

On the above reef are the two small rocky Ballenatos Cays, barren, white, and about the same height. They are about 3 miles apart, and the eastern one lies about a mile from the west end of Largo Cay. There is said to be anchorage in 7 to 10 fathoms water northward of them.

Between East Guano Cay and Rosario Channel the bank does not extend more than between one and 2 miles southward of the cays (except at the Jack Taylor Reef) with 16 to 13 fathoms water, rocky bottom, and the soundings diminish rapidly to the reef.

Jack Taylor Reef.—Several positions have been assigned to this dangerous shoal. Commander H. D. Grant, of H. M. S. Steady, in April, 1863, fixed the position of the reef in latitude 21° 28′ N. and longitude 81° 47′ 30″ W. From 12½ fathoms water, coral and sand, the soundings decrease regularly to the reef, which is of coral. From the masthead the white water may be seen running in like a spit until it joins the main bank. The Caiman fishermen say there are 5 and 6 fathoms water all over this spit.

Rosario Cay, when first seen from the southward, has the appearance of three small islands, the largest being in the center. As it is approached some sand cliffs will be observed, by which it will be known from those in the immediate neighborhood. The shore of Largo Cay on the east, and that of Cantiles Cays to the west, are wooded.

Rosario Channel.—Between the west end of Rosario Cay and Cantiles Cay there is a channel through the reefs; but at its inner end, to the westward of the Passage Cays, there are only 9 feet water. The opening in the reef leading into this channel lies southward of the west end of Rosario, and is ⅛ mile wide. It is steep at the sides, and in the middle the depth is three fathoms; ½ mile from the north point there is a rock which shows above water.

Tides.—The rise of tide in Rosario Channel is about 2 or 3 feet, but the periods are uncertain, and chiefly dependent on the strength of the wind.

Dry Shingle.—From the Rosario Channel the edge of the bank runs about SW. for 16 or 18 miles, and just within it a formidable barrier coral reef extends to within 3 or 4 miles of the Dry Shingle, the most southern danger. From the Dry Shingle the bank trends in a NW. and west direction until near the east end of Isle of Pines; but this part of the bank should be approached with very great caution, for although the Caiman fishermen say that it is clear of danger, its limits are uncertain. On the bank there are numerous small islets, cays, and reefs.

Calapatch Mehagen Reef is one mass of coral just awash, and many vessels have been wrecked on it. The reef is in latitude 21° 26′ 50″ N., longitude 82° 10′ 36″ W. There are soundings about a mile outside the shingle, in from 5 to 14 fathoms.

Caution.—In leaving the Rosario Channel, do not steer to the westward of S. 26° W. (S. 22° W. mag.) until a good offing is gained, especially if the weather be cloudy, and observe that the cays to the westward of Rosario are lower than Largo Cay.

Water.—It is said that good water may be found by digging wells on any of these cays. The fishermen resort to Rosario Cay for this purpose and for the cabbage palm, which grows in great abundance on these islets.

Cocoa Plum Cay lies eastward of the east end of Isle of Pines, and the line of white shallow water between is very distinct. The anchorage under the cay is sheltered by a reef to the eastward, and by the adjacent cays westward. The eye is the guide through the white water, as there are no marks.

The Isle of Pines is of irregular shape with a deep bay on the western side, sheltered on the SW. by a projecting tongue of land.

The southern half of the island is low and swampy, but the northern part is more elevated and in some places mountainous. Very many water courses and lagoons along the shore are navigable for vessels drawing 7 or 8 feet of water. The island is covered with trees, affording, as its name indicates, pine spars and masts for vessels.

Most of the inhabitants, about 800 in number, live in the northern part of the island, where the capital, Nueva Gerona, is situated. Cattle are raised here to a considerable extent.

In making the land from the southward three mountains first come in sight. On these, the westernmost and highest, called Dolphin Head, or Mount Jose, appears from the south as one peak, but from the westward three peaks are seen. It can be seen 45 miles off.

South and West Coasts.—From Piedras Point, the southern shore, which is of sand, runs about SW. by W., 25 miles to the western end of the Larga Beach; sand banks extend off the western portion of this coast. The Larga Beach is all along skirted by a reef for from ½ to ¾ mile, and the bank extends about ⅛ mile beyond it. Off the east end of this beach there is a small opening in the reef with sufficient depth for coasters, which find good shelter within.

From the western end of the Larga Beach the coast, which is composed of soboruco rock or low white cliffs of bleached honeycombed coral and indurated sand, runs a little northward of west for 9 miles to Cape Pepe, the SW. extreme of the island; thence it trends NNW. about 2 miles to Cocodrilo Bay, where fishing vessels generally take shelter. Perdenales Point lies about NW. by N. 7½ miles from Cocodrilo Bay, and is foul to the distance of ⅛ mile. All this part of the coast is steep-to, and deep water will be obtained within ¼ mile of the reef, which closely skirts it.

Port Frances.—From Perdenales Point the coast trends about NNW. 3 miles to Frances Point, the most western of the island, forming a bay called Port Frances. This bay is convenient for vessels stationed on the south coast of Cuba, affording good shelter during the strong trade wind. The anchorage is good all over the bay by selecting the white spots, as the water is very clear. The most convenient for getting under way is with the following bearings: Perdenales Point S. 19° E. (S. 23° E. mag.) and the NW. extreme of Bush Cay N. 33° W. (N. 37° W. mag.). A sand bank skirted by a coral reef, and very shallow, borders the north shore, and extends some distance round Bush Cay. There is good fishing with the seine on the north shore; spiny lobsters abound, and rays and alligators frequent the boat channels.

Water.—About 200 yards from the east end of the longest beach there are some wells of good water; but the ground being rocky the casks will have to be filled in the boat, or, if on the beach, rafted. There is good fishing in the bay, and wild cattle frequent the wells at noon and in the evening.

Siguanea Bay.—From Bush Cay a ridge of rocks extends off ¾ mile to the edge of the bank, and at the same distance NNE. of the cay lies a dangerous patch with only 6 feet water on it. The cay is separated from the point by a small boat channel, carrying 8 feet water, leading into Siguanea Bay. The shore from Frances Point turns abruptly to

the SE. for 15 miles, and is skirted by low mangrove cays; it then bends round to the NNE. for 7 miles to a point, forming the inlet, in which there is excellent anchorage for vessels of light draft. A bar, however, about a mile in breadth, runs right across from Frances Point to the south end of the Indian Cays, and has only 16 feet water on it. The depth increases within the bar to 3½ and 6 fathoms, and then gradually decreases towards the shore.

The edge of the bank lies about 1½ miles outside this bar, and is so steep that the first cast near the cays may be 3 fathoms; the depth gradually decreases, and a vessel may work in by the lead and come to in any part of the bight. The deepest part of the bar is about 4 miles SW. of the Indian Cays.

A vessel of light draft may haul into Siguanea Bay, when about 2 miles to the northward of Frances Point. The depths are 5 and 6 fathoms in the middle of the bight, gradually shoaling towards the shore. There are no dangers, and the holding ground is excellent.

Water.—There is a watering place in Siguanea Bay, a little to the southward of the Water Hills, the first elevated land from the head of the bight; but the casks must be rolled about 150 yards. There are also two good springs at the foot of the Siguanea Hills, where water may be obtained at a little distance from the shore.

Tides.—The rise of tide in the bay is about 6 inches, but after a strong Norther it is only 3 inches, or less.

Indian River.—The entrance to this river lies N. 7° W. (N. 11° W. mag.), 5½ miles from the eastern point of Siguanea Bay. Good anchorage, exposed only to the westward, will be found in 2½ fathoms water, about a mile off shore.

A mud bar is formed across, making it difficult for even light boats to get in, except at high water; but, having crossed the bar, from one to 3 fathoms will be carried for 4 miles up. About 2½ miles within the entrance, the mangrove swamps merge into the pine country and a little higher up, strong and serviceable spars may be cut of any size under a frigate's topmast, so as to fall into the river. When green they generally sink, but they quickly dry and become much lighter. Pigeons, raccoons, and crocodiles are found in abundance, and great numbers of hogs run wild through the woods.

The Coast from the Indian River runs about NNW. 8 miles to Indian Point, which lies N. 41° E. (N. 37° E. mag.) 14 miles from Bush Cay. From Indian Point the shore takes a NNE. direction 9 miles to Barcos Point, the NW. extreme of the island, which is low, and forms the north side of a shallow bay called Barcos Bight. Thence it trends about east, 11½ miles to the mouth of the River Casas, which is the loading place of Nueva Gerona, and has the greatest trade with Cuba.

The River Casas is navigable for boats to some distance. It is fed by numerous rivulets, and about 4 miles up the water becomes fit for use. On its left bank the Casas Range rises to a considerable elevation,

and on the high lands are some small settlements where cattle and pigs may be procured, but vegetables are scarce.

Mount Diablo.—From the mouth of the Casas, the coast runs E. by N. about 4 miles to a small peninsula named Mount Diablo. Between, there is a ridge of hills of moderate height called Mount Caballos, and the coast is here more firm and free of swamps. From Mount Diablo, eastward of which there is a small islet, the shore trends southeastward 7 miles to the River Santa Fé. From Salinas Point 5½ miles southeastward of Mount Diablo the shore to the southward is skirted by a reef.

River Santa Fé.—This stream is navigable for small vessels of light draft for some miles, and for boats to the village on the right bank. The water is good for drinking. About three miles up, a branch turns off to the SW. called the Mal Pais, which is also deep enough for small craft and for boats to a considerable distance. The arm terminates in an extensive lagoon.

East Coast.—From the mouth of the Santa Fé the eastern shore bends around to the SE. and south, forming the east side of the island, which is low and swampy. To the eastward of the river the shore is fronted by a chain of low mangrove cays which curve round to the NW. on the north side of the island and terminate at Pipa Cay, about N. 38° E. (N. 34° E. mag.), 18 miles from Barcos Point. Between them and the north shore of the island there is a depth of 2½ and 3½ fathoms, over mud and weed, which may be carried up to Mount Diablo; but thence to the eastward it gradually becomes shoaler, and off the mouth of the Santa Fé there are only 9 feet. The holding ground is excellent; but on account of the bar between the Indian Cays and Frances Point, which is the way in, it is inaccessible to vessels drawing over 16 feet.

Tides.—It is high water, full and change, on the north side of the Isle of Pines, at 6h. 0m., and the rise is 3 feet.

Mangles Islets.—This chain of islets and cays, composed of several groups, under the names of Ingleses, Rabihorcado, Alcatraces, Pipa, etc., is known as the Mangles Group. They are surrounded by shallow water, which extends some distance from them. From Pipa Cay the islets trend in a SE. by E. direction for about 20 miles and terminate at the Ingleses Cays, which form the NW. side of the channel of the same name. On the south side of this passage another chain of islets extends to the southward, joining the island near Corral Point, the eastern extreme.

A sand bank surrounds the latter cays at the distance of a mile, connects itself with the great bank eastward of the Isle of Pines, and, trending in that direction 18 miles as far as Tablones Cay, thence runs ESE. 11 miles to Cantiles Cay, on the west side of Rosario Channel. To the north of Cantiles Cay, but on the eastern side of the channel, are the Passage Cays; thence the edge of the Jardines runs northward and NE. to Traviesa and Rabihorcado Cays, forming two indentations separated

by the former, and then trending with a southerly curve to the reefs at the NE. extremity of the Jardines, eastward of Diego Perez Cay.

Flamenco and Culebra Channels.—About 5 miles southward of Calavera Cay, the western of the two forming Hacha Channel, lies Flamenco Cay, and a mile westward of the latter is Culebra Cay. Between the reefs extending in all directions from these two last cays is a passage with 1¼ fathoms water. Between Flamenco Cay and those NE. of it there is a channel carrying 1¾ fathoms; but care should be taken to guard against the reefs which run 3 miles to the southward and westward nearly to the meridian of Flamenco Cay. Between Culebra Cay and the Petatillos banks there is another channel with 1¾ fathoms.

The Petatillos are two (fifteen by chart) banks, equal in form and extent, which rise above water and are separated by a passage carrying 2¼ fathoms water. Over the greater part the bottom is white, but the lead should be carefully attended. These banks begin about 4 miles southwestward of Culebra Cay and extend 14 miles W. by S., with a breadth of about 2 miles.

Laguna and Hambre Cays.—About 12 miles SW. of Culebra Cay lies the most northern of the Laguna Cays, which, together with those of the Hambre Group, extend about S. by W. 6 miles. This chain of islets is encircled by a reef which also surrounds the Petatillos and Culebra Cay. Between the Laguna Cays and Petatillos Banks there is said to be a passage with 2¼ and 2¾ fathoms water, which facilitates the communication with Hacha Channel, and the passage between Cruz and Monterey Cays.

About 4½ miles S. 38° W. (S. 34° W. mag.) of the most southern of the Hambre Cays is Pipa Cay, and the channel between carries about 2 fathoms water.

Dios Cay.—Nearly 18 miles S. 71° W. (S. 67° W. mag.) of Pipa Cay is Dios Cay, small, low, and surrounded by reefs which extend to the NE. for 10 miles, where there is a channel a mile wide and nearly a fathom deep; thence the reef continues eastward for 8 miles to Pipa Cay and borders the south side of the Mangles Group at 2½ and 3 miles off, as far as English Channel; on the northern side of the group the reefs are about a mile off. Between Dios Cay and Carraguco Point is the passage for vessels which trade with Batabano. There are also said to be channels with 2¾ and 3¾ fathoms water between the Dios and Indian Cays and between the Dios and San Felipe Cays.

Indian Cays form a group 7 miles in extent; they are low, covered with trees, and separated by small channels. The most northern of the group lies about S. 15° W. (S. 11° W. mag.), 13 miles from Dios Cay and the southern N. 21° E. (N. 17° E. mag.), 9¼ miles from Bush Cay off Frances Point). In the channel between them and the latter point there are nearly 3 fathoms water, over mud and weed, which it is said may be carried up to Dios Cay. These cays are surrounded by reefs,

which from the south part extend 2 miles to the southward, and from the northern 2 miles northwestward.

San Felipe Cays form a chain 13 miles in extent east and west and are low, marshy, and covered with mangroves. They lie 11 miles southward of Fisga Point. San Felipe Cays, like the former, are bordered by reefs which run northwestward 6 miles to Cucaña Bank, which has 8 feet water on it and lies SW. 13 miles from Fisga Point. Between the reef extending 5 miles westward of Cucaña Bank and the coast of Cuba the channel is about 8 miles in breadth and 1¾ to 2½ fathoms deep; there is also a one-fathom patch northward of this west extreme of the reef and midway between it and the shore.

The bank between San Felipe Cays and Cape Frances is steep-to, but close within its edge it shoals very quickly and there are patches of only 1¾ fathoms water about 8 miles northeastward of the cape. The bottom is of sand and weeds, but in places not visible. There is a well of good water near the beach, on the south side of the most eastern of San Felipe Cays, and in the vicinity of all of them turtle and fish abound. The west end of San Felipe is reported as being 5 miles westward of the position charted.

Tide.—The rise of tide at San Felipe Cays is about 2½ feet; but it is irregular. The high tide appears to take place in the morning, and the low tide at night. The flood stream runs to the NE. with much strength.

The Coast of Cuba from Mangle Point takes a WSW. direction to Cape Corrientes; the land is low, thickly wooded, and the shore is chiefly formed of soboruco or white indurated sand cliffs from 10 to 20 feet high, steep-to. About 4½ miles eastward of the cape, moderate depths may be obtained about ½ mile from the shore.

Cape Corrientes is a low sandy point, with the ruins of a stone wall a short distance within it, at the edge of the low trees which cover the land in the interior. There are a few small dry rocks about 50 yards from the point, and a shallow rocky spit runs off ¼ mile SW. of them. Two-thirds of a mile off shore the depth is 5 fathoms. This point has been mistaken by strangers for Cape San Antonio, from the land of Cuba appearing to terminate here, on account of the deep bight of Corrientes westward of it; but the lighthouse on Cape San Antonio clearly marks the distinction; besides, as Corrientes is approached, should the weather be clear, the distant mountain ranges of Organos and Rosario may be seen to the northward.

Anchorage.—There is good temporary anchorage in 9 fathoms water, with Cape Corrientes bearing N. 83° E. (N. 79° E. mag.) and distant about 1½ miles.

Corrientes Bay.—About 3 miles northward of Cape Corrientes there is a remarkable rocky cliff, called Caiman Bluff. Thence the shore trends northerly, curving eastward, for 7 miles, and then turns abruptly to the westward. The bluff is of soboruco, steep, and higher than any other part of the coast of the bay; to the northward of the cliff a small

vessel may anchor in 5 fathoms water, close to the sandy beach, by carrying a hawser to the shore. This is the only anchoring place in the bay which affords shelter from the strong SE. winds. Elsewhere there is no bank, the shore is low, steep, and covered with trees.

At the head of the bay, about 6 yards from the shore, there is a spring of fresh water, which rises in bubbles to the surface of the sea. Ten miles WSW. of the head of the bight is a remarkable piece of scarped land forming a cliff of soboruco at a short distance from the beach, called Balcones; thence the shore trends SW. 8 miles to Holandés Point.

Holandés Point, 15 miles from Cape Corrientes, is the western extremity of the bay of the latter name. The water is discolored for about a mile off the point. For 3 miles on either side of the point the shore is bounded by a rocky cliff about 35 feet high, and at the extremity of the point there is a remarkable red spot. From the east end of the cliff a reef extends off shore about 300 yards as far as this red spot, and the depths are from 14 to 20 fathoms ½ mile outside it. From Holandés Point the coast trends about W. by N. 7 miles to Perpetua Point. Between is Piedras Point, off which a reef extends about 600 yards. Perpetua Point lies about 3 miles SE. by S. of Cape San Antonio, and on it is a fisherman's hut.

Cape San Antonio.—See page 143.

Tides.—It is high water, full and change, at the west end of Cuba at 9h. 30m., and the rise is generally about 1½ feet. The flood sets to the northward, the ebb to the southward, at the rate of about half a knot; but there is frequently no stream at all, or a strong current to the SE.

Current.—The current on the south side of Cuba is variable, and generally very strong. Its usual course is to the westward, and between the Grand Cayman and Cape San Antonio it sets to the NW. It is, however, frequently found setting in an opposite direction, and appears to be greatly influenced by the force of the prevailing trade wind. An easterly stream is generally felt after a prevalence of light winds, and more particularly during, and for a short time after, a north wind in the winter season. Sometimes, however, on such occasions, it will only extend to about 20 miles off shore. Some observations tend to show that an easterly set is more frequently found during the increase of the moon, and this is the opinion of the Cayman fisherman, who are constantly passing to and fro from their island to the Jardines, Jamaica, and the Mosquito shore.

Hence, with so much uncertainty, the greatest attention is necessary in navigating on this side of the island, especially in the neighborhood of the Isle of Pines and the Jardines, which are so imperfectly known, and where the stream is also frequently found to set strong towards the cays and reefs, and the lead is of but little use. In running between Jamaica and the Grand Cayman and from thence between Cape Catoche and Cape San Antonio, the reckoning cannot be too frequently

checked. In beating up from Cape San Antonio, a vessel may obtain some assistance from the land wind, but in the winter season it does not extend far from the shore and is very uncertain.

In the space between the Jardines and the cays of Doce Leguas, there is generally no current whatever; but between Cay Breton and Caballones Channel it runs 1½ miles an hour to the westward.

Winds.—From October to May the NE. trade-winds blow freshly along the south coast of Cuba, but are temporarily interrupted at times by winds from NW. and north.

From May to October, however, the prevailing winds are light, and show an inclination to haul round with the sun every day, commencing in the evening with a northerly wind off the land, by daybreak veering to ENE., then by noon through east to ESE., and by 4 p. m. arriving at SW., where it continues till it falls calm, and is succeeded in the evening by the land wind. With this knowledge, a vessel may get considerably to the eastward from May to August, when calms and light winds prevail, and on other occasions during changeable winds, especially at night.

The greatest difficulties in getting to windward exist between Cay Breton and the Caballones Channel, where the current runs strong to the westward; but after passing East Channel, there will be no difficulty in reaching Cape Cruz. To the eastward of the cape it is useless to work to windward near the coast, but from it a vessel will probably reach Falmouth or St. Ann Bay on the north coast of Jamaica.

Caution.—The strong currents and untrustworthy character of the charts make it incumbent on the navigator to exercise even more than ordinary caution and vigilance while near the land on the coast of Cuba.

CHAPTER VIII.

THE WINDWARD CHANNEL AND JAMAICA, WITH THE NEIGHBORING BANKS AND CAYS.

The Windward Channel is between Haiti and Cuba. The northern part is perfectly clear, with no dangers; but the southern part is somewhat obstructed by several banks and cays, among which are Navassa Island, the Formigas Bank, and Morant Cays.

The Currents in the channel generally set to the SW., attaining a strength of from one to 2 knots between Cuba and Haiti. South of Cuba and Jamaica the set is more to the westward.

Directions.—Vessels from Jamaica usually run to leeward round Cape Antonio, and through the Florida Strait; but from October to March, when northerly winds prevail in the Florida Strait, the Windward Passage should be preferred, although ships are frequently opposed here by contrary winds and currents. In taking this passage the coast of Haiti must be gained as soon as possible, as there a windward current is frequently found. In steamers or sailing vessels with a fair wind, after passing the east end of Cuba, a course may be shaped for any of the passages between the Bahama Islands, but the Turks Island Passage is not much used from the southward. The Caicos Passage is well to windward and perfectly safe in the daytime, but the Crooked Island Passage is the best lighted, and with the light on San Salvador Island, or Watling, should be quite safe to navigate by day or night, from the north or south.

Navassa Island is 32 miles from Cape Tiburon. Its surface is nearly level, with steep, sloping sides, terminating all round in bold perpendicular white cliffs about 20 feet high. It is inaccessible, except at the landing platform on the western side, which is used for the shipment of guano.

The island is of volcanic origin, composed of limestone, interspersed with veins of sharp, honeycombed rocks of iron pyrites.

The spaces between the rocks are filled up with guano, which in some places is 14 feet deep.

With the exception of the NW. extreme a prominent bluff, a narrow ridge about 15 feet high above the cliffs and 200 yards broad, extends all around the island. The summit is clothed with stunted palm trees

and cactus, and is inhabited by iguanas and numerous flocks of sea birds.

The present position of the settlement of Navassa is on the SW. side of the island.

The landing is situated about 500 yards N. 20° W. (N. 22° W. mag.) of the SW. extremity of Southeast Point, and there is a signal station on the bluff about 700 yards N. 25° E. (N. 23° E. mag.) of the same point.

There are two mooring buoys in line with and bearing S. 80° W. (S. 78° W. mag.) of the signal station and distant from it, respectively, about 900 and 1,300 yards.

Anchorage.—On the west side the bottom is fine sand, with small shells, and anchorage will be found with the usual trade wind in 16 fathoms water, good holding ground, with the NW. bluff bearing about N. 20° W. (N. 22° W. mag.), and the SE. point S. 66° E. (S. 68° E. mag.), about ½ mile off shore; but a heavy swell sets round the SE. end of the island. A current of from one to 2 knots sets along the shore in a NW. direction, changing to west at the last of the ebb. The wind seldom blows from the westward. From the NW. end of the island a coral ledge with 4½ fathoms water on it extends 200 yards off.

Formigas Bank.—The SW. end of this bank lies N. 33° E. (N. 31° E. mag.), about 39 miles from Morant Point, and from the center of the bank, the fall in the high land of Jamaica will be seen to the northward of Plantain Garden River. The bank is 8 miles in length, and about 2½ miles in breadth. It is steep-to, and near its edge there is a narrow vein of sand with from 9 to 18 fathoms water on it; but the body of the bank is rocky, with a general depth of from 5 to 7 fathoms. About 2 miles from the NE. end, and one mile from the eastern edge, there is a small patch with only 2½ fathoms on it, and westward of it another of 3 fathoms, with 3½ and 4 fathoms round them. With strong breezes the position of the bank may be recognized by the heavy swell which rolls over it.

Albatross Bank, about 30 miles southeastward of Morant Point, extends 10 miles in a NE. by N. and SW. by S. direction. The bank has from 17 to 23 fathoms over it, but has not been completely examined, and it is quite possible there may be less than 17 fathoms on it.

Morant Cays, 33 miles from Morant Point, are a group consisting of three small islets from 7 to 10 feet high, which, with the adjacent reefs, form a crescent, convex to the southeastward, and occupying a space about 3 miles long and 1¼ miles broad.

The bank on which these islets stand extends (within the 100-fathom line) 6 miles northeastward from the group and 4 miles southwestward of them, with an average breadth of about 3 miles, and with depths over it ranging from 10 to 18 fathoms. They are known as Northeast, Southeast, and Southwest Cays.

A reef, on which the sea constantly breaks, surrounds them. There

is only one opening through this reef, situated between Southeast Cay and Southwest Cay, with from 18 to 20 feet in it. This opening should not be used except in cases of emergency.

Sea birds arrive at these cays in great numbers during March, and in April the islets are covered with their eggs, which are collected and conveyed in schooners to Jamaica. Later in the summer turtle are caught, but the supply is becoming scarcer every year.

The supply of guano is abundant but of poor quality. Several, wrecks which are occasionally broken up by the sea and drift into the anchorage, lie on the reefs round these cays. In clear weather the high land of Jamaica is visible. Blue Mountain Peak, bearing N. 43° W. (N. 46° W. mag.) of Southwest Cay, is distant 52 miles.

Northeast Cay is at times divided into three portions, the sea washing over the connecting sand spits. A conspicuous cocoanut tree stands in the center of the cay, with some smaller trees and bushes southward of it, and at the north extremity of the islet are two isolated trees. On the southern portion of the cay are one or two houses and a small pier, also a pond of brackish water. A sand bank, 4 feet high, lies 200 yards southward of this cay.

Southeast Cay is covered with bushes and trees, among which one cocoanut tree rises considerably higher than the others. There are two houses on the cay and a pier on the west side. The sand spits extending from the extremities of this islet alter in shape at different seasons of the year. In summer the SW. spit is washed away and the sand deposited on the western shore of the cay.

Southwest Cay.—There is one house on this cay which can be seen from a distance of about 8 miles. A rocky ledge is used as a pier for shipping guano. Landing is seldom practicable at Southwest Cay, but at the other islets, especially at their SW. extremes, an opportunity of doing so can generally be found. It is not advisable to land at the piers on the islets on account of the submerged reefs in the vicinity.

Anchorage.—On the west side of Morant Cays the bank slopes gradually off to the depth of 10 fathoms, and anchorage may be taken up by the lead, carefully avoiding the irregular ground extending NW. of Northeast Cay. The bottom is composed of dead coral with patches of small brown weed growing over it.

When approaching from the northwestward the water shoals suddenly after passing the 100-fathom line, but a vessel may safely stand in, Southeast Cay bearing S. 42° E. (S. 45° E. mag.) until in the required depth for anchoring.

Small vessels drawing not more than 12 feet will find smooth water at ½ mile westward of the south extreme of Northeast Cay, but with strong northerly winds this is not a safe anchorage, as the sea then breaks in 3 fathoms.

Water may be procured by digging wells near the center of either Northeast or Southeast Cay, taking care, however, not to dig as deep as the level.

Current.—The drift current sets towards west and NNW., with a velocity of ¾ knot an hour after the trade wind has been blowing freshly for a day or two. A northerly current of 1½ knots an hour has been met approaching from the eastward. When the trade is lighter a current setting to NE. or east is frequently experienced.

Directions.—Vessels having occasion to pass near Morant Cays at night should keep northward of them.

In standing in for the east end of Jamaica from the SE., Yallahs Hill, which bears from the Southeast Cays about NW. distant 43 miles, will be a useful guide in clear weather, and in working up to the northward of the cays, the NE. end of Jamaica, kept open of Morant Point, will lead to the windward of them.

Tides.—The rise and fall of tide at Morant Cays seldom exceeds one foot.

Jamaica is the largest and most valuable of the British West India Islands. On the north it rises into hills of gentle ascent, covered with pimento groves and intersected by valleys, while on the south it presents abrupt precipices and inaccessible cliffs.

The coast line is 500 miles long. The northern shore is free of dangers and generally steep-to, but the south side, particularly near the middle, is deeply indented and fringed with reefs and cays, which must be cautiously approached. The principal ports are Kingston, Port Royal, Port Morant, Black River, and Savannah-la-Mar on the south coast, and St. Lucea and Montego Bay, Falmouth, St. Ann, Ports Maria, Antonio, and Annotto Bay on the north.

The Blue Mountains, a lofty range, run through the whole length of the island from east to west, attaining a height of 7,300 feet, but the highest peaks are generally hidden by clouds. Other shorter ranges branch off in every direction. The valleys are all very narrow, not more than the twentieth part of the island being level ground. The principal rivers are the Minho, Black River, and Cobre, all emptying on the south coast, but none of them are navigable except for boats.

Seasons.—The land and sea breezes are regular, except for a short time before the rainy season. The temperature of the year near Kingston ranges between 70° and 80°, but a difference of elevation affects the temperature very sensibly. At 4,200 feet above the sea it usually ranges between 55° and 65°. The year is divided into a short wet season, beginning in April or May and lasting about six weeks; a short dry season, from June to August; a long wet season, comprising September, October, and November, and a long dry season, occupying the remaining four months, during which the weather is serene, pleasant, and comparatively cool.

Population in 1881 was 580,804—14,433 white, and the remainder colored and blacks.

Earthquakes are frequent, and sometimes violent.

Hurricanes are not so frequent as in the Windward Islands, coming generally between July and October.

Morant Point, the east end of Jamaica, is formed by a strip of low, swampy, wooded land, extending out about 2½ miles from a low range of hills about 800 feet high, running parallel to the south coast at the foot of the Blue Mountains. It is about 2½ miles broad at the inner part, and thence gradually diminishes to the point, which is sharp and well defined when seen from the north and south. Approaching from the eastward, its position is first recognized by the iron lighthouse, 96 feet high, standing a few hundred feet within the high-water mark.

Light.—The lighthouse on Morant Point exhibits a fixed white light at 115 feet above the sea, and is visible 15 miles between the bearings N. 33° E. (N. 30° E. mag.) and S. 29° E. (S. 32° E. mag.) over an arc of 242°.

Reef.—The point is skirted by a reef, which extends off to the distance of nearly ¼ mile. There are 22 fathoms water at 1¾ miles off, close to the edge of the bank, and as the land is not more than 20 feet high, should the weather be thick or the light obscured the greatest caution must be observed when nearing it. Overfalls are generally seen eastward of the point, near the edge of soundings, and the stream runs at from one to 3 knots.

Caution.—In approaching Jamaica from the eastward, as in many other localities in the West Indies, great advantage will be gained from observing meridian altitudes of stars north and south at morning and evening twilight, after losing sight of Alta Vela, until Morant Point light or Yallahs Hill is sighted.

Yallahs Hill is about 19 miles westward of the point and can not be easily mistaken, being a remarkable mountain, rising rather abruptly on its north side from the valley between it and the Blue Mountain Range, and falling with a long, gradual slope to the sea on the south side, and its rounded summit is seldom clouded.

Approaching from the NE. through the Windward Channel, the Blue Mountain mass will generally come first in sight, and strangers are apt to keep away too soon, which should not be done until the vessel's position is correctly ascertained, lest they may not be able to weather Morant Point. It is advisable to keep well to windward until the lighthouse bears northward of west, as the current generally sets strong to the westward.

Coast.—From Morant Point light the coast trends S. by W. ½ W. 1¼ miles to Southeast Point; between is a sandy bay studded with rocks; it then turns WSW. ½ W. for 5 miles to Rocky Point, and continues in the same direction for 3 miles farther to Port Morant. Between Southeast and Rocky Points the reef extends from the shore to an average distance of one mile, and between Rocky Point and Port Morant to ½ mile, and in ordinary weather the sea breaks heavily upon it. Within the reef at Rocky Point is a secure anchorage for coasters, and a good landing wharf. To seaward the bank of soundings extends about one mile.

Port Morant is a small, secure bight. The approach to the harbor is easily distinguished. The hills on the western side, between 400 and 500 feet high, slope gradually to the shore, and are higher than those on the eastern side, which rise abruptly from the sea. At the head of the harbor is a remarkable red cliff, and 2 miles inland, at an elevation of about 500 feet and between two palm trees will be seen Kelly House, the easternmost of two houses near together. Palm Point, on the western side of the entrance, may be known by the conspicuous cluster of trees on it.

Good water may be obtained from the pier off the village.

The United States is represented by a consular agent.

Dangers.—Harbor Shoal, a sandy knoll with 2 fathoms on it, lies nearly in the center of the port, N. 65° W. (N. 68° W. mag.) of Point Pero, and with Kelly House open westward of the red cliff. Cotton-tree Spit is a little northward of Harbor Shoal, and extends from the eastern shore ⅛ mile.

Buoys.—On the eastern side of the channel, leading into the port, are two buoys, the outer in 26 feet is colored black and white in horizontal stripes, the inner in 20 feet is checkered black and white; on the western side is one red buoy in 26 feet. The southern edge of Harbor Shoal is marked by a red buoy in 22 feet water. The northern edge of Harbor Shoal is marked by a white buoy in 16 feet water.

Cotton-tree Spit buoy, checkered red and white, lies in 16 feet water.

Leith Hall Spit buoy, painted red and white in vertical stripes, lies in 12 feet water close to the southern edge of Leith Hall Spit.

A red buoy is moored on the edge of the bank running off the shore from Battery Point. The position of the buoys can not always be depended upon.

Directions.—In entering Port Morant great attention must be paid to the leading mark, for in strong trades and misty weather some difficulty may be experienced in distinguishing Kelly House. Kelly House, in line with the eastern extreme of Red Cliff, bearing N. 4° E. (N. 1° E. mag.), leads on the eastern side of the channel, and clear of Harbor Shoal and Cotton-tree Spit; when Pero Point shuts in the low point south of it, haul a little to the eastward of the leading mark and anchor in 5 or 6 fathoms, with Bowden Pier about N. 42° E. (N. 39° E. mag.). As a rule vessels can enter or leave with the usual trade winds, and they seldom wait for the land wind in the morning. The rise of tide is about one foot.

Morant Bay.—From Port Morant the shore bends in to the town of Morant, and then the Belvidere Point, forming the bay. The reef still skirts the shore to the distance of about ½ mile, but becomes more broken, with a better channel within, and terminates altogether south of the wharf at Morant.

The sea breaks on this extreme end, and under the lee of it there is anchorage for large vessels in 5 or 6 fathoms water, with the court house

bearing about N. 13° E. (N. 10° E. mag.). A short distance westward of Port Morant there is a narrow opening through the reef leading into Fisherman Bay, in which the soundings are from 3 to 2 fathoms, but it is only fit for coasters. Within the reef to the westward are other anchorages of the same character.

The English Church and the courthouse, both a little northward of the principal wharf, are the most conspicuous buildings in the town.

Galatea Rock is a small dangerous patch with 2¾ fathoms water on it, lying about 600 yards SW. of the western reef off Morant, with 7 fathoms between, and steep-to. From it, Belvidere Point bears N. 84° W. (N. 87° W. mag.) distant 1$\frac{4}{10}$ miles, and courthouse, N. 6° E. (N. 3° E. mag.) distant ¾ mile. Large ships standing into the bay should not bring the courthouse to bear northward of N. 25° E. (N. 22° E. mag.).

Upper White Horses.—From Belvidere Point the coast takes a W. ¾ S. direction for 7 miles to Yallahs Point, at the base of the lofty mountain already described. About 4 miles eastward of the latter point there is a small range of remarkable white cliffs of moderate height, called the Upper White Horses Two miles southward of the White Horses is an extensive flat with a depth of 11 and 12 fathoms, dark sand; northward and southward of this flat the water is shoaler.

Lamottes Bank, a small rocky patch of 4 fathoms, may be considered the commencement of a narrow bank of 7 to 9 fathoms, which curves in an easterly direction for 3 miles, until nearly south of Belvidere Point. From the 4 fathoms, Yallahs Point bears N. 65° W. (N. 68° W. mag.) 2½ miles.

The water is usually so clear that the bottom may be seen in 10 fathoms.

The Coast from Yallahs Point turns in a northerly direction for about ½ mile, forming Salt Pond Bay, thence it sweeps to the westward round Yallahs Bay, which is 1¾ miles from the point. Cow Bay Point, W. ¾ N., 4 miles from Yallahs Point, is low, rounded, and wooded, and its extreme is nearly 2 miles from the foot of the hills. One mile from the coast stands the chimney of the estate of Albion, which, with the cultivated land around, are conspicuous from seaward. Small craft find shelter under Yallahs Point from the strong trade wind, which sometimes continues for three or four days. Large vessels might also anchor here, but care must be taken to avoid an 18-foot patch from which the point bears S. 65° E. (S. 68° E.) distant nearly ⅓ mile.

In Yallahs Bay vessels of considerable size load logwood; the best anchorage is south of the center of the bay in 10 fathoms, about ⅓ mile from the beach, but it would be prudent to weigh on the first signs of a southerly wind, as a very heavy sea sets into the bay, and ships have been wrecked.

Off this portion of the coast, at a distance of about ½ mile, the depth is 100 fathoms.

Westward of Yallahs Bay the river of that name flows into the sea.

From Cow Bay Point the coast trends with a slight curve inwards, NW. ¼ N., for 4 miles to the Lower White Horses, a similar small ridge of cliffs to those eastward of Yallahs Point. They lie at the base of a large round hill, 1,420 feet high, connected by sharp ridges with St. Catherine Peak, of 5,100 feet, which is about 8 miles NE. of Kingston, and the same distance westward of the Blue Mountains; this range forms the eastern boundary of the great plain of Liguanea, on the shore of which is the City of Kingston. From the Lower White Horses the coast runs to the WNW. for about 5 miles to the commencement of the Palisados, the foot of the Long Mountain, and the head of Kingston Harbor, over which is a conspicuous martello tower; one mile N. 65° W. (N. 68° W. mag.) of the tower is a remarkable red cliff, which has been blasted to a considerable height and forms an excellent landmark. Along this portion of the coast the bank of soundings extends about ½ mile from the shore.

Land and Sea Breezes are generally regular between Port Morant and Port Royal. As far as Yallahs Point the land wind is felt but a short way from the shore; westward it extends to a greater distance. Working off Point Morant in the early morning, the sea breeze is almost invariably met with, the land wind being only of sufficient strength to carry a vessel clear of the harbor. Off Port Royal ships frequently carry it some distance to sea. In the early months of the year, when the trade wind is not very strong, the land wind may come down with considerable, but never with dangerous, strength. Its approach will be known by a strong earthy or dusty smell. The strongest sea breezes appear to be in June and July, and, freshening as they advance westward, attain their greatest force off Port Royal. The time of commencement of the sea breeze varies from 9 a. m. to noon, and generally lasts until 5 or 6 p. m., but in some cases it may blow continually for three or four days. The beginning of the land wind is equally uncertain. In the summer or hurricane months the breezes are sometimes interrupted by calms and light southerly winds, with heavy rains and an exceedingly oppressive atmosphere. The sea breeze will rush in with violent squalls from the SE. and last but a short time.

Currents.—Between Point Morant and Port Royal, at an average distance of 3 miles from the shore, the current setting to the westward is seldom found to exceed one mile per hour, depending upon the strength of the wind. East of Point Morant it sets in a south and SE. direction at the rate of between 2 and 3 knots, causing a heavy sea. Two or three days of southwesterly or westerly winds will cause a slight current in an opposite direction. After heavy rains, the discharge from the rivers will for a short time cause a slight local set.

Port Royal.—From about one mile south of the martello tower a low narrow, sandy flat projects to the westward for about 7½ miles, terminating in Port Royal Point, on which is Fort Victoria, but it is not a very conspicuous object. This peculiar tongue of land is more or less overrun with low mangrove bushes, particularly on its inner side, and is in

part planted with cocoanut trees; it forms the harbors of Port Royal and Kingston and is called the Palisados. Near its western extremity is Fort Charles, and within it, the town of Port Royal, naval hospital, yard, and dock. (Warping buoys are placed near the coaling wharves at the east end of the dockyard, and a buoy with staff marked 25 feet lies on the edge of the bank south of these wharves.) From its eastern extreme the sandy beach takes a westerly direction for 2 miles and then trends SW. for 1½ miles to Plum Point.

Plum Point.—Eastward of Plum Point the beach is fringed with a rocky ledge for about 200 yards and about ½ mile N. 75° W. (N. 78° W. mag.) of it is Little Plum Point, both points being foul for about ¼ mile; westward the beach is clearer, but rocks skirt some of the points.

Light.—At 200 feet northward of the extremity of Plum Point is a white lighthouse, which exhibits at 68 feet above the sea a white light with red sector, visible 14 miles. The light shows red between the bearings of N. 60° W. (N. 63° W. mag.) and N. 10° E. (N. 7° E. mag.,) and white from N. 10° E. (N. 7° E. mag.) round by east to S. 40° E. (S. 43° E. mag.) over the shoals fronting the harbor. A faint diffused white light is visible northward of the bearing, N. 60° W. (N. 63° W. mag.).

The East Channel to the harbor is formed on the north by the Palisados, and on the south by numerous low cays and banks which extend off shore to the distance of 3 miles, and soundings will be found from 2 to 4 miles outside them. The outer danger at the entrance of the channel is called the East Middle Ground, which lies S. 26° W. (S. 23° W. mag.) about 1¼ miles from Plum Point. The channel is from 7 to 20 fathoms deep, and with the exception of the shoals on either side it is clear of danger up to Gun Cay.

East Middle Ground.—The rocky bank is composed of two knolls occupying a space of ground about ½ mile and separated by a narrow cut of deep water in a north and south direction. On the eastern knoll there are 12 feet of water, and on the western 8 feet, steep-to, and the sea generally breaks when strong sea breezes prevail. A large black and white vertically striped buoy with a staff and cross-batten marks the NE. edge of the eastern knoll in 7 fathoms.

Maiden Cay and Rock.—Maiden Rock lies about 1½ miles westward of the East Middle Ground and NE. ¼ mile from Maiden Cay, which is sandy. It is a low barren rock, 100 yards long east and west, and 50 yards broad, having on its north end a black and white striped beacon, vertical 30 feet above the sea. It is connected with Maiden Cay by a rocky ledge, dry in places, which extends also 200 yards to the northward of the beacon, and to the westward for about 800 yards.

Lime Cay is 400 yards long in a NNW. and SSE. direction, 100 yards broad, and partially covered with bushes. Its NW. end is rocky for 300 yards; the west and SE. parts are sandy. In case of necessity a vessel will find anchorage close under its lee in 10 fathoms, muddy bottom, taking care, however, to avoid the Lime Cay Shoal.

Lime Cay Shoal is a rocky patch, with 1¼ fathoms water on it, and about ¼ mile in length NW. and SE. The eastern ledge lies ¼ mile westward of the NW. end of Lime Cay. Dockyard clock tower in line with the east end of Gun Cay clears it to the westward.

Racum and Gun Cays are the two innermost in this channel. The former lies N. 76° W. (N. 79° W. mag.), nearly 1¼ miles from Lime Cay, and S. 42° E. (S. 45° E. mag.), a little more than ½ mile from Port Royal Point. It is very small, low, and barren, and from its north end a ledge of small dry rocks extends out 200 yards in that direction, at the extremity of which is a black and white vertically striped buoy in 3½ fathoms water, with 5 fathoms close outside it. The cay is also foul on the south and west to the distance of nearly ¼ mile, but steep-to on the east side. The cay is barely 2 feet high.

Gun Cay, about 800 yards N. 26° E. (N. 23° E. mag.) of Rackum Cay, is somewhat larger, sandy, and bushy. It is skirted all round by a reef which extends only a short distance from its south end, leaving a good channel about 200 yards wide between it and the Rackum Cay buoy. The reef extends 200 yards from the north side of Gun Cay, marked at its extreme by a buoy striped black and white vertically.

Approaching Port Royal by the East Channel, Gun Cay, being wooded, is visible from a considerable distance, but Rackum Cay can only be seen on nearing the harbor.

New Shoal is a very small knoll with 24 feet water on it at about 140 yards southward of Port Royal Beach. A buoy striped black and white horizontally lies in 4½ fathoms water, with Kingston church spire over the southeastern extreme of Fort Charles Beach and the dockyard clock tower, and Fort Charles flagstaff in line. Between the shoal and beach the passage is clear, and there are 7 fathoms water within 40 yards of the buoy.

When buoys are temporarily removed, white nun buoys will be placed in their positions.

Beacon Shoal, a similar small rocky head with 14 feet water on it, lies at about 200 yards S. 48° W. (S. 45° W. mag.) of New Shoal, and and about ¼ mile southward of Port Royal Point. A beacon 12 feet high is placed in 16 feet water on the middle of the shoal; it carries a cone-shaped cage painted black and white horizontal stripes.

Harbor Shoal is about 40 yards in extent, with 2¾ fathoms water on it, and lies N. 53° W. (N. 56° W. mag.) 400 yards from Port Royal Point. It is marked by a red buoy with a staff, and close to its south side the depth is four fathoms.

De Horsey Patch, with 4¼ fathoms water on it, lies 200 yards north of Harbor Shoal.

Port Royal Spit is a shoal formed by the submergence of part of the town in the earthquake of 1692. It extends off to the westward a little more than 200 yards from the center of the town.

Church Shoal, of coral formation, on which there is a depth of 11

feet, is situated 50 yards northwestward of the 3-fathom edge of Port Royal Spit, with a channel inside 110 feet wide and 3 to 4 fathoms deep.

This shoal, within the depth of 3 fathoms, extends NE. and SW. for a distance of about 40 yards, and is about 25 yards in breadth.

A conical red buoy is moored about 20 feet west of the shoal.

South Pelican Spit is the northern boundary of the harbor, and is formed by a very shallow sand bank which runs off ¾ mile westward of Gallows Point. Its southern edge is marked by a pile. These are all the dangers in entering the harbor from the eastward.

Directions for East Channel.—The bottom of this channel is generally mud and sand, except for a short distance eastward of Gun Cay, where it is mud only. In the harbor it is mud, with a little sand, except near the shoals, where it is formed of broken coral and sand.

A pilot will be generally found off the east end of Jamaica. Run along the land about 3 miles off, passing southward of Lamottes Bank, and when abreast Cow Bay Point, Plum Point may be steered for, on nearing which to about 1½ miles a vessel will be in soundings, and the East Middle buoy should be seen 1 1/10 miles to the southward of it. Then bring the flagstaff of the Apostles Battery in line with the flagstaff of Fort Charles, bearing N. 76° W. (N. 79° W. mag.), and run on for Gun Cay; or the fall of Salt Pond Hills on with the west extreme of dockyard wall N. 73° W. (N. 76° W. mag.) leads in. The leading mark should be brought on before Plum Point lighthouse bears N. 3° E. (north mag.), in case the buoy should be adrift or out of its position.

From this distance a stranger will have some difficulty in making the first of these marks out, and will require the use of a glass. The Apostles Battery is small, and built on the brow of a slightly projecting ridge, about two-thirds the way down from the summit of the Salt Pond Hill. Fort Charles will appear as a long, low, red wall, just rising above the sea, and behind it will be seen the masts of the guard ship and vessels in the harbor, and to the northward of it the church, dockyard, clock tower, and extensive range of Government buildings. This mark will lead up to the buoy on the north end of Gun Cay Ledge, when steer for Port Royal Point, passing between it and the buoy on the New Shoal, and on either side of the Harbor Shoal. Having passed the latter, and westward of Port Royal Spit, haul up and choose a berth as most convenient.

As the turning at Gun Cay Point is rather sharp for long vessels in a strong sea breeze, they may pass through between Gun and Rackum Cays. In this case, when abreast of Lime Cay, steer for that narrow opening, and bring the flagstaff of Port Henderson, at the northern foot of Salt Pond Hill, in one with Port Royal Point, which mark will lead through, but the eye should be the guide for mid-channel; and after passing close to the northward of the Rackum Cay buoy, steer to pass outside the Beacon Shoal, and then haul up. Vessels should not pass between the New and Beacon Shoals.

The most convenient berth for merchant vessels will be found outside Port Royal Spit; they should therefore shorten sail in time after passing the point. Ships of war secure to mooring buoys off the dockyard, to which they are directed by signal, the buoys being numbered.

In entering, all the black and white striped beacons and buoys should be left to port, except the beacon on Beacon Shoal, which leave to starboard.

At Night.—When about 3 miles off Cow Bay Point, the red light on Plum Point will generally be seen, and it may be steered for. Running for the channel, its western limit should not be passed or the white light brought in sight until at about one mile from it, in order to clear the East Middle Ground, then steer for Gun Cay as before. Having rounded the buoy at the north end of Gun Cay, steer about S. 59° W. (S. 56° W. mag.) until the light is open of the south end of Gun Cay, bearing east (N. 87° E. mag.); then alter course to N. 76° W. (N. 79° W. mag.), which will carry a vessel between the Beacon Shoal and West Middle Rock.

When Fort Augusta light bears N. 6° E. (N. 3° E. mag.) a vessel may haul up westward of Harbor Shoal; if a steamer and going on to Kingston, Fort Augusta light kept on a N. 15° E. (N. 12° E. mag.) bearing will lead westward of the Pelican Spits, and when at the distance of ½ mile from the light the vessel will be near the edge of the shoal ground on the north side of the channel, when the course should be altered to the eastward, and the mariner should feel his way slowly, guided by the piles. When the red light at Fort Augusta bears southward of west (S. 87° W. mag.) steer more to the eastward.

If the land breeze is likely to overtake the vessel before getting through the east channel, it will be better for a sailing vessel not to proceed farther to leeward than the Upper White Horses, but to stand off and on until the sea breeze comes down in the morning. It will be advisable not to be too hasty in bearing up until the sea breeze is observed to have firmly established itself in the harbor, for the crew will only be worried in bracing about the yards to the conflicting winds.

Kingston Harbor is a large spacious inlet running east and west, formed by the Palisados, and capable of containing many vessels of the largest size. Shoals extend westward and northwestward for one mile from Gallows Point, and eastward bordering the northern shore of the Palisados at the distance of from ¾ mile to a mile as far as abreast the city, which, with the shallow ground on the northwestern shore of the harbor, contract the ship channel to a very narrow breadth.

Ship Channel.—This channel lies along by Fort Augusta, an extensive fortification on the extremity of a low sandy spit of swampy land on the northwestern side of Port Royal Harbor, and is pointed out by pile beacons on either side striped red and white vertically on the northern side, and red on the southern.

A beacon, in form of a cross, Fort Augusta painted on it, is erected 277 yards S. 39° E. (S. 42° E. mag.) of Fort Augusta light.

A red buoy lies on the south side of the channel, from Fort Augusta S. 84° E. (S. 87° E. mag.) 1¼ miles. The narrowest part of the channel commences at about 650 yards S. 20° E. (S. 23° E. mag.) of the flagstaff of the fort, and is here 300 yards wide. Farther on, at 700 yards eastward of the staff, the breadth of the channel between the piles is reduced to 100 yards. Thence it opens out gradually as the vessel advances to the eastward, with depths of 6 and 7 fathoms. Vessels of large draft lie alongside the wharves of the town, above which the water deepens to 9 and 10 fathoms. A beacon surmounted by a St. Andrew's cross, painted red and white checked, has been placed on the southern edge of the shoal extending westward from Kingston custom-house.

Light.—The beacon at Fort Augusta is now a white iron tripod beacon, with a square lantern and pyramidal roof, surmounted by a large A painted black, facing south, down South Channel.

From the beacon, at 37 feet above high water, a fixed white light shows down South Channel, and a fixed red light eastward, or up the harbor, visible in clear weather about 10 miles.

Kingston, the capital of the island, stands on a gentle slope, the population being 49,000. The streets are regular and straight, and the public buildings large. The residences of the upper classes are fine, with large grounds around many of them. The city is healthy, the range of the thermometer being from 71° to 86°. The island is divided into medical districts, under the head of the superintending medical officer.

The authorities to be visited are the governor of the island and commodore of the naval station.

Salutes will be returned.

The United States is represented by a consul and vice-consul.

The Royal Mail Steam Packet Company have had a point at the inner end of their wharf established for the use of their captains in rating chronometers. This spot will be readily pointed out by any of the employés of the company.

Position: Latitude, 17° 57′ 52″ N.; longitude, 76° 48′ 06″ W.

Quarantine is strict, all vessels being boarded by a health officer. There is one public hospital.

Supplies.—Provisions are plentiful and moderate in price. Water is brought to the end of wharves in pipes, and is charged for as follows: Steamers of from 70 to 150 tons, $2.92; 151 to 250 tons, $5.84; 251 to 350 tons, $8.76; 351 to 500 tons, $11.67; 501 to 600 tons, $14.60; 601 to 1,200 tons, $17.52; 1,201 tons and upwards, $20.43.

Sailing vessels same rates up to 500 tons; above 500 tons, $14.60.

Coal can be had in any quantity; price for best Welsh, from $7.30 to $7.80.

Steamers.—There is regular communication with New York, Halifax, London, and Liverpool.

Telegraph to Havana and from thence to all parts of the world.

Pilotage inwards, not exceeding 7 feet, $10.94. For each additional foot or part thereof, $1.46. Outwards, not exceeding 7 feet, $6.81. For each additional foot or part thereof, 97 cents.

Dues.—No manifest or health officers' dues. No hospital tax. Kingston Harbor duties: Vessels under 70 tons, $1.82 for vessels trading in the tropics; all other vessels, $3.65. From 70 to 160 tons, $4.87; from 160 to 350 tons, $7.30; from 350 to 850 tons, $8.50; 850 tons and upwards, $9.73. Light dues: Steamers, 1⅛ cents per ton, net register, once a quarter; sailing vessels, 10 cents per ton, net registry, for each entry.

A Boat Channel marked by stakes, having 3½ feet at low water, has been dredged close to Gallows Point for the convenience of steam launches plying between Port Royal and Kingston.

Directions for Leaving.—Having passed the pile off Creek Pond, a bushy cay (just north of Fort Augusta) in line with a large cotton tree on the lowland westward of it leads to the narrows. Sailing vessels will find it advantageous to shift to the fairway at Port Royal the day previous to departure, so as to quit with the land wind at early dawn, and to get out well clear of the shoals before the sea breeze sets in.

East Channel.—If bound to windward, the East Channel will, of course, be the best; but it should only be taken by steamers or vessels of handy size that will insure staying. The channel can be readily followed in thick weather, avoiding the shoal off of Plum Point. The range marks in South Channel are often obscured.

Turning Marks.—Should the sea breeze overtake a vessel after getting to the eastward of Gun Cay, she may stand toward the Palisados till the flagstaff of the Apostles Battery is in one with the belfry of Port Royal Church, until near Rocky Point, when the staff must be kept open to the southward of the belfry to avoid the reef off the point.

Eastward of that point use the same turning mark until near midway between Middle and Little Plum Points, when the staff of the Apostles Battery must not be brought to the northward of the north part of Fort Charles to clear the shoals off the latter point. When Kingston Church bears N. 2° W. (N. 5° W. mag.), do not stand farther to the northward than the flagstaff of the Apostles Battery, in line with that of Fort Charles, to avoid the foul ground off Plum Point.

Standing to the southward toward Lime Cay Shoal, do not approach it nearer than to bring the flagstaff at Port Henderson just touching Port Royal Point; and when standing toward Lime Cay, do not come within 400 yards of the north end. When eastward of it, the high bluff point at the south part of Green Bay, kept open of the north part of Lime Cay, will clear the foul ground to the northward of Maiden Rock,

and approaching the East Middle Shoals, keep the high cliffs at the south part of Green Bay open to the northward of Lime Cay until clear of them. It is seldom large ships work through this channel; the capabilities of the vessel and the force of wind and swell should be considered.

South Channel is a narrow vein of deep water through the close mass of shoals which lie south and west of Port Royal. It is nearly always used by sailing vessels leaving at daylight with the land wind; the buoys on the east side are red, and those on the west red and white.

West Middle Rock is a very small head, with 22 feet water on it, lying directly at the entrance of the channel. On it there is a floating beacon, forming with the beacon on Fort Augusta the leading mark for this channel.

The depth of water in the vicinity of West Middle Rock beacon has decreased, and vessels drawing over 20 feet should not approach within 200 yards of the beacon.

West Middle Knoll, with 27 feet water on it, lies N. 82° W. (N. 85° W. mag.), ¼ mile from the West Middle buoy. When on the knoll the Martello Tower near Rock Fort is in one with the south knob on Gun Cay; and the beacon on West Middle Rock in line with the easternmost cocoanut tree on Port Royal Point.

West Middle Shoal is a coral bank partially covered with a thin layer of sand, and near the center has as little as 2 feet of water on it, steep-to, particularly on the west side. At its NW. end is a red buoy. There is a patch with 5 fathoms water on it S. 60° W. (S. 57° W. mag.), 600 yards from the center of the shoal.

Turtle Heads are numerous detached rocky shoals, some nearly awash, which extend to the eastward from Small Point. A red and white vertical striped buoy is moored in 4¾ fathoms water, on their outer edge.

This part of the channel is about 800 yards wide; the leading mark carries just eastward of a shoal with 4¾ fathoms water on it. Should the buoy be adrift, the dockyard clock tower on with the eastern angle of Fort Charles will lead half-way between the shoals and the 27-foot knoll.

Drunkenmans Cay.—The eastern side of the South Channel is pointed out by this small low cay of stones and sand, the trees on which are much higher and darker than those on the neighboring islet. A short distance to the northward of it there is a dry sand bore, and from thence it is nearly connected to the south end of the West Middle Shoal by rocky ledges in some parts dry and with deep narrow channels between the ledges.

A beacon, 12 feet high, pyramidal in shape and painted red, has been placed near the center of the coral patch (awash) lying N. 25° W. (N. 28° W. mag.), distant 400 yards from Drunkenmans Cay.

South Knolls.—Nearly midway between Drunkenmans Cay and the

Turtle Heads, on the line of the leading mark, are several small detached heads of hard sand, on which there are 27 and 30 feet water.

Portuguese Shoals are two small banks at the SE. side of the entrance of the South Channel, and about a mile westward of South Cays. There are only 6 feet water on the easternmost, 17 to 23 feet on the other, and a red buoy with a staff and vane is moored in 5 fathoms water on the western edge, with Healthshire beacon in line with Healthshire Hummock N. 81° W. (N. 84° W. mag.); the beacon is white, and close to the beach in Halfmoon Bay. The channel is here ½ mile wide, and the west side is formed by Bush Reef, on which the sea generally breaks.

Three-Fathom Banks are two detached banks lying off the SE. end of Bush Reef, at the SW. side of the entrance to the South Channel; the outer is S. 31° W. (S. 28° W. mag.) ¾ mile from the Portuguese buoy. The least water on the inner bank is 19 feet, on the other 18 feet. Vessels after passing the Portuguese Shoal should steer well to the eastward and take care not to get to leeward on these banks, or Wreck Reef. There are other patches southward of these; the shoalest has 5 fathoms water on it.

A buoy with cage, painted red and white in vertical stripes, is now moored in 3½ fathoms on the east side of Three-fathom Banks.

Wreck Reef lies about one mile off the point of the same name, and S. 42° W. (S. 39° W. mag.) 4½ miles from the Portuguese Shoals. Should the vessel be drifted to leeward and unable to weather this reef, she may run round its north end and anchor close to leeward of it, to await the land wind to carry her out again. The south entrance should not be used. A shoal with a depth of 4¼ fathoms lies N. 54° E. (N. 51° E. mag.) 1½ miles from Wreck Reef.

California Bank.—This bank is 2½ miles long in a NW. and SE. direction, one mile broad, and composed of coral, sand, and shells; depths of 21 to 27 fathoms were obtained near the center (in lat. 17° 46′ N., long. 76° 47′ W.), 25 fathoms at the NW. and SE. ends, and no bottom at 100 fathoms close to its SW. edge.

The NW. end of California Bank lies southwards 9 miles from Plum Point lighthouse, and 3 miles outside the 100-fathom line of soundings.

Directions.—A vessel leaving by the South Channel should be under sail with the land wind at dawn. If, however, she has good sailing qualities she may leave with the sea breeze, provided she can lie up S. 8° E. (S. 11° E. mag.). Having passed close to the westward of West Middle Rock beacon, keep it in line with the beacon at the SE. angle of Fort Augusta, and a notch in the Liguanea Mountain, N. 6° E. (N. 3° E. mag.); the latter, however, is difficult for a stranger to recognize, and is frequently obscured.

If of heavy draft, on approaching the South Knolls, when a gap in the distant hills comes on with the south extreme of Small Point (which is conspicuous) N. 67° W. (N. 70° W. mag.), keep a little to the west-

ward until the dockyard clock tower comes just open of the east angle of Fort Charles, and keep it so till the high or southern end of Drunkenmans Cay bears east (N. 87° E. mag.) when haul up again on the leading mark. When Healthshire beacon, which is white and close to the beach in Halfmoon Bay, is just open to the northward of Healthshire Hummock the vessel will be clear of Portuguese Shoals, and may be hauled to the wind, or, if bound westward, continue on the same course clear of the outer shoals of Wreck Reef, taking care to keep the Apostles Battery well open eastward of Small Point until well to the southward.

A vessel will generally have the assistance of a strong outset as far as Drunkenmans Cay, when she will meet the usual westerly stream and heavy swell; therefore, should the land wind fail at this point she had better anchor under the south end of the cay during the calm which intervenes, sometimes for several hours, between the breezes, in order to avoid being set on the shoals to leeward. By no means run the risk of having to bring up outside the Portuguese Shoals. Should the sea breeze set in before she has cleared the channel, and she should be obliged to work out, which is a very hazardous undertaking, except under most favorable circumstances, do not stand farther to the westward than to bring the notch in the mountain on with the center of a low house in Fort Augusta, nor to the eastward than to bring the notch on with the east end of that fort.

Entering by South Channel.—When approaching Port Royal from the southward, Salt Pond Hills bearing north (N. 3° W. mag.) will clear Wreck Reefs. Steer up with the dockyard clock tower a little open west of Drunkenmans Cay, until South Cay comes on with Plum Point lighthouse, when the leading mark for South Channel may be brought on, and proceed as before directed.

Soundings extend for 4 miles to the southward of the cays, and the edge is very steep, there being in places only 14 fathoms water at 200 yards within the 100-fathom line. In the fairway of the channel the bottom is generally composed of mud and sand, and occasionally clay, but near the reefs it is sand, with portions of broken coral.

Supplies.—Water, coal, and provisions may be obtained at both Kingston and Port Royal at reasonable prices.

Tides.—It is high water, full and change, at Port Royal Dockyard, at about 11h. 0m., and the rise and fall is from 10 to 11 inches. There is no regular tidal stream, but in general there is an outset from the harbor and through the South Channel at the rate of a quarter to one knot an hour, until as far as Drunkenmans Cay, where it takes a more westerly direction, and generally increases in strength. Sometimes it will be found running in this direction at the rate of 2½ knots; a good offing should therefore always be obtained before shaping a course to the westward.

When the land breezes have been strong, and light southerly winds have prevailed during the day for a short period, it often occurs that

the current is running to the eastward in the morning, even as far as the East Middle Shoals, when it takes a more southerly direction, and to the southward of the shoals it will be found setting to the SW. or WSW., the strength quite depending on the force of the wind that has been blowing.

Portland Bight.—The highland of Healthshire terminates at Polink Point. Thence the coast trends to the NW. and sweeps around to the southward, forming between it and Portland Point an extensive bight. The shore is skirted by small islets and detached reefs, within which are several excellent anchorages for vessels of moderate draft. The outer part of the bight is also protected by numerous reefs and small, low wooden cays, with channels between them capable of admitting vessels of the largest draft. The best channel to enter by is between Pelican and Bare Bush Cays, through which a vessel will carry from 6 to 8 fathoms of water.

Pelican Cays.—About 3 miles from the northern shore of the bight are two small, low, bushy cays, nearly ½ mile apart NNW. and SSE., which lie near the center of a rocky ledge, 3 miles in length east and west, and one mile in breadth. The ledge generally shows itself, and the west end is dry and steep-to. In the channel to the northward of it the depth is only 3 fathoms.

Bare Bush Cay lies S. 20° W. (S. 17° W. mag.) 2¾ miles from the Big Pelican, and rises 800 yards within the NE. end of an oval-shaped coral bank of the same name.

Morris Shoal, which lies N. 76° W. (N. 79° W. mag.) 1½ miles from Bare Bush Cay, is a coral knoll with 4 feet water on it, about 200 yards in extent, steep-to, with a clear channel about ½ mile wide between it and Bare Bush Bank, and also between it and the NE. end of Portland Reef, one mile SW. of it. On the eastern side of the shoal is a red buoy with a staff and cage in 6 fathoms.

Portland Reefs and Cay are 4¼ miles in length NNE. and SSW., and about 3½ miles in breadth from Portland Bluff. Half a mile within the SW. end of the reef is Portland Cay, a small, bushy islet; and about 2 miles N. 25° E. (N. 22° E. mag.) of it are two more similar cays, called the Halfmoon Cays, ½ mile apart, NE. and SW., and lying ½ mile within the NE. point of the bank, which generally breaks in most parts. On the Portland Reefs are many shoals and dangers. The chart will be the best guide, but there is no safe passage through any part of these reefs for any but the smallest vessels.

Pigeon Island, the largest of the outer group, lies 1½ miles westward of the west end of the Pelican Reef. It is low, and steep-to on its east and south sides. The NW. side forms a small bay, off which there is anchorage in 7 or 8 fathoms water.

White Shoal is a small detached knoll with 2¾ fathoms water on it, steep-to, lying north ¾ mile from Pigeon Island. A black buoy in 4½ fathoms lies on the eastern side of the shoal.

Directions.—Vessels bound into Portland Bight should have the assistance of a pilot. In coming from Port Royal, having passed well to the southward of Wreck Reef, edge to the westward until the north peak of Brazaletta Hill bears N. 70° W. (N. 73° W. mag.). This hill can not well be mistaken, being the northernmost of two remarkable elevations on the western range of mountains, about 800 feet high, with a deep gap or valley between. Steer in upon this course, and, as the vessel advances, Pigeon Island will be seen from aloft on the same line of bearing.

If bound to Old Harbor, which is the northernmost anchorage in the bight for vessels of moderate draft, being between Pelican and Bare Bush Cays, a remarkable hummock will be seen on the northern ridge of mountains, something in the form of a jockey's cap, called Cudjoe Hill. When this hummock comes in line with the base of the western slope of the hill at the east end of Goat Island, N. 6° W. (N. 9° W. mag.), haul up with this mark, and it will lead to leeward of the dry reef at the west end of the Pelican Bank, and between it and White Shoal, in 5½ to 6½ fathoms water. When the Northern Pelican Cay bears S. 84° E. (S. 87° E. mag.) steer N. 31° W. (N. 34° W. mag.) so as to pass about ½ mile to the SW. of Careening Island. When abreast the latter island the wharves of Old Harbor will come in sight and will direct a vessel to an anchorage off them in 4½ or 4 fathoms, between Careening Island and the NE. end of the reef, which fronts the western shore and generally shows itself.

If bound to Long Wharf, having entered the channel as before, round White Shoal gradually to the northward, and bring the upper house at Long Wharf in one with the north end of the gap or flat open space in the mountains, N. 37° W. (N. 40° W. mag.). This mark will lead through the best opening in the reef in 4 fathoms, which is here a mile from the shore, and when within it anchor, as most convenient, in 3½ or 3 fathoms water.

Beacon.—A beacon, 16 feet high, and surmounted by a triangle 8 feet across at the base, and painted white, has been placed on Careening Island.

Salt River.—The entrance to the anchorage lies between Long and Salt Islands. Having entered the Pelican Channel and being abreast the cays, it will be better to shape a course so as to pass around the south end of Pigeon Island, which is steep-to. Thence a N. 42° W. (N. 45° W. mag.) course 3½ miles will lead to abreast of Salt Island. Round its north end at the distance of about 400 yards, steer for the entrance of the river, and anchor off it in 3 fathoms water, with the south side of Pigeon Island just in sight to the southward of Salt Island. Pigeon Island, however, is so low that in a small vessel this mark must be watched from aloft. Large vessels will find a well-sheltered anchorage in 5 fathoms, close up under the NW. side of Salt Island.

Peake Bay being open to the eastward, with strong sea breezes, a heavy swell rolls in. The best holding ground will be found in 3½ or 4

fathoms water, under the northern sandy shore, about a mile within the outer part of the reefs. The entrance bears N. 82° W. (N. 85° W. mag.) 3½ miles from Pigeon Island.

West Harbor is an extensive shallow bight on the north side of Portland Ridge, in which there is a depth of only 8 or 9 feet. The channel is ½ mile in breadth, and lies between the reefs (which are dry in places) that form the south side of the entrance into Peake Bay and those which extend off ½ mile from the NE. point of Portland. The only anchorage for vessels of large draft is just to the westward of the northern reefs in from 5½ to 4 fathoms water, where the holding ground is good.

Directions.—Vessels should leave either of these anchorages with the land wind at early dawn, in order to get clear of the outer reefs before the sea breeze arrives; should it, however, overtake them before they get to the eastward of Pigeon Island they may work out in moderate weather either to the northward or southward of it; the former will be the best route, as the water will he smoother. In this case do not stand too far to the southward, and avoid White Shoal.

Goat Island and Cabrietta Point may be approached by the lead, not coming within the depth of 4½ or 5 fathoms. Should it blow hard it will be better to anchor under the lee of Pelican Reef until the breeze lulls or the land wind comes off.

If unable to lay through and the sea is smooth enough to allow of working out of the Pelican Channel, in standing toward Morris Shoal do not bring Bare Bush Cay to the southward of S. 65° E. (S. 68° E. mag.); and in approaching the Pelican Reef do not open the fall of Brazaletta Hill to the northward of Pigeon Island. A vessel may stand toward the white water off Bare Bush Cay to the depth of 5 fathoms, remembering the 4½-fathoms patch between Bare Bush and Pelican Cays.

Portland Ridge is flat wooded land, of moderate height, and when seen from the eastward has the appearance of an island. The 100-fathom line is 11 miles from this part of the shore, and it may be approached in the day time to the depth of 6½ fathoms, at 1½ miles off.

Caution.—A vessel bound to leeward, however, must be careful to keep the land of Portland to the northward of west (S. 87° W. mag.) to avoid the cays and reefs just described, which are somewhat hidden by the eastern point.

The current generally sets strong to the westward, and although the soundings are regular a vessel at night should not come within the depth of 12 fathoms.

Rocky Point, about 6 miles westward of the south point of Portland, and the west end of the table land of the same name, is foul for a distance of ¾ mile to the SW. A bank called Robertson Shoal extends westward and northwestward of the point for a little more than one mile, 6 feet being the least water on it.

Carlisle Bay lies immediately to the northward of Rocky Point, and for small vessels is sheltered with the usual breezes as far round as SE. Anchorage will be found off the wharf, on about a N. 48° E. (N. 45° E. mag.) bearing, and Rocky Point about S. 62° E. (S. 65° E. mag.), in from 3¼ to 4½ fathoms water. A shoal with 2 fathoms water skirts the shore about ¾ mile off. Westward of Robertson Shoal, in 5¾ fathoms, is a red buoy with staff and ball.

Directions.—Entering Carlisle Bay, Robertson Shoal should not be rounded until Kemp Hill is open west of the wharfinger's house bearing N. 3° W., (N. 6° W. mag.) when the vessel may haul up N. 31° W. (N. 34° W. mag.) and anchor according to draft.

The Coast from Carlisle Bay sweeps inwards with a deep bend to the NW. as far as Alligator Point, which is 17 miles from Rocky Point; Milk and other rivers empty themselves in this bight.

Milk River.—Vessels loading here call first at Port Royal, where they pay light dues.

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Buoy and Beacon.—A black buoy with staff and cross, marking the eastern limit of the ballast ground off Milk River, lies in 4 fathoms about a mile off shore.

A white beacon in the shape of a diamond, on a staff 44 feet high, has been erected on the east bank of this river near the mouth. The beacon is visible from a distance of 8 miles between the bearings of N. 3° E. (north mag.) and N. 42° W. (N. 45° W. mag.)

The Coast.—Between Milk River and Alligator Hole, at 2½ miles to the westward of it, the shore is composed of red and white cliffs 50 feet high, thence to Alligator Point, sandy beach.

At 3¼ miles westward of Alligator Hole there is a small stream named Gut River, which may be recognized by a remarkable bare space on the steep rising ground over it.

Alligator Point is 30 feet high, whence the land rises to a height of 2,000 feet at a distance of 2½ miles in a northerly direction.

Brune Bank, about one mile in extent and rocky, with 4½ fathoms on its shoalest part, lies S. 42° W. (S. 39° W. mag.) 9½ miles from Milk River.

Soundings.—The edge of the bank of soundings lies 17 miles southward of Milk River, and 14 miles southward of Alligator Point; there are depths of 20 fathoms near the edge, and no bottom at 100 fathoms close to.

Alligator Reef.—This rocky bank is about 1½ miles long ENE. to WSW., and dry in places, the small rocky heads just showing above water; it is 2½ miles to the southward of Alligator Point and should be given a wide berth at night, as 9 and 10 fathoms, near its outer edge (which is steep-to), are the uniform depths at that distance from the coast. Between the east end of the reef and Alligator Point (which may be passed within ½ mile) there are 5 to 7 fathoms.

Beacon.—A beacon, about 20 feet above high water, consisting of an iron tripod surmounted by a cap colored red and white in horizontal bands is placed on the NE. part of Alligator Reef.

Alligator Pond Bay.—Between Alligator Point and Little Pedro Point, 3¼ miles westward of it, lies Alligator Pond Bay; the shore of this bay for a distance of 2¼ miles westward of Alligator Point is rocky with low cliffs, thence to Little Pedro Point a sandy beach, the land behind rising precipitously to 800 feet.

Anchorage.—The anchorage in Alligator Pond Bay is in 4½ fathoms (mud bottom), about ½ mile from the wharf near the center of the bay; it is sheltered from the eastward by Alligator Reef, but with westerly and southwesterly winds a heavy swell rolls in, when the shore should be cautiously approached on landing, so as to pass close to leeward of some rocks that lie in the same line of direction as the wharf, at a distance of 100 yards.

Little Pedro Point, 20 feet high, is a rocky ledge projecting 200 yards from the shore, and land behind rising suddenly 900 feet, thence gradually to 1,670 feet at a distance of 2 miles northward.

The Coast from Little Pedro Point forms a small bay to the westward, in which there is an indifferent landing, thence it trends westward 7¾ miles to Pedro Bluff. About 3 miles west of Little Pedro Point lies Cutlass Point, and midway between them there is a large whitish triangular spot (named the White Horses) at a height of 600 feet, on the cliffs which rise 1,000 feet nearly perpendicular from the sea; ½ mile westward of the White Horses there is a remarkable white spot 500 feet above the sea.

The land over Cutlass Point rises abruptly 1,710 feet, thence gradually 2,400 feet to Mount Bellevue at 2¼ miles northward of Cutlass Point; between this point and Pedro Bluff the coast curves slightly to the northward, forming Jacks Hole.

A rocky ledge, awash, fringes the coast between Little Pedro Point and Pedro Bluff, except under the White Horses.

Pedro Bluff is a prominent headland, rising abruptly 220 feet from the sea, and sloping to 70 feet at ⅔ mile inshore, whence the land again rises gradually to 1,780 feet northward of the bluff.

Pedro Bay.—There is occasionally a heavy swell in this bay, especially after a continuation of easterly or southeasterly winds, when the depth of water in the bay decreases 2 or 3 feet. Landing is not at all times good. The bay affords temporary anchorage in 4½ fathoms.

The coast from Pedro Bay to Black Spring Point has several indentations, the largest of which is Frenchman Bay. This part of the coast is reef-bound, with the exception of one or two passes known to fishermen and to the pilots residing along the coast, who look out for vessels making the pilot signal.

From Black Spring Point, which has on it a low sand heap, the land rises 520 feet to Sand Hill Range, at a distance of ¾ mile to the northeastward.

Starve Gut Bay.—A ledge of reefs awash extends around the shore of this bay, except in the NE. part, where there is a small sandy beach, from which a morass commences and extends between the sand hills that fringe the coastline and Sand Hill Range to beyond Black River.

The bay affords a temporary anchorage in 4 fathoms ½ mile from the shore, and is used occasionally by small vessels bound to the eastward, when unable to work against the current, which, after a continuation of easterly winds, sets from one to 1½ knots an hour to the westward.

Parattee, or Sand Hill Point, is low, having on it a few palm trees. The coast reef projects ¾ mile westward from this point, and extends in a northerly direction as far as the line of reefs that protects the anchorage off Black River.

Banks.—Blossom Bank, situated 10 miles southward of Luana Point, extends over a space of about 16 square miles, and has on it depths varying from 18 to 26 fathoms; it is separated from the bank extending from the south coast of Jamaica by a deep channel about 1½ miles in breadth.

New Bank, on which there is a depth of from 15 to 23 fathoms, is situated 8 miles westward of Luana Point, and covers about 13 square miles. Both these banks are of coral formation.

Black River Anchorage.—Between Parattee Point and the mouth of Black River, 4½ miles distant, the coast extends north for 2 miles, and then, trending to the NE. and westward, forms a bight, nearly in the center of which is the entrance of Black River.

Moco Point, 1¼ miles westward of the river entrance, is formed of large mangrove trees 25 to 30 feet in height. Between this and Malcolm Point, distant a mile, is Hunt Bay, fringed with mangrove trees.

Commencing at the beach under the courthouse—a large two-story building with portico in front and wings connected by archways—and gradually extending its distance to ¼ mile off Moco Point, extends a reef, which thence follows the coast line into Hunt Bay. Malcolm Point has also a small fringing reef.

Malcolm Bay, between Malcolm Point and Long Acre Point, has good temporary anchorage for vessels waiting for a pilot.

From Long Acre to Burnt Ship Point, one mile westward, is a sandy beach, off which Doctor Reef and other foul ground extends seaward ½ mile. Thence to Luana Point, WNW. a mile, are sandy beaches and rocky ledges alternately.

Shoals and Reefs.—Off Parattee Point the foul ground gradually increases its distance from the shore from ¼ mile to 1½ miles, where the bay commences to trend to the NE. Thence the foul ground, including Barrack and Ravient Reefs, which have several patches and sharp heads of rock, extends to the WNW. 2 miles; according to local information these are rapidly growing. Inshore of Barrack Reef extend the Inner Barrack Reefs, having 2 and 2¼ fathoms to within 1,600 yards of the hospital, which was formerly used as barracks.

A coral patch about 100 yards in diameter, and having over it a depth of 6 feet, is situated at the eastern part of Black River Anchorage.

From this shoal, Black River Church bears N. 3° E. (north mag.) distant $1\frac{4}{10}$ miles, and Pynado or Crane Wharf S. 81° E. (S. 84° E. mag.) distant $1\frac{4}{10}$ miles.

Directions.—In entering Black River Bay, Pedro Bluff bearing S. 56° E. (S. 59° E. mag.) and open of Blackspring Point, leads clear of the reefs off Parattee Point. Blackspring Point open of Parattee Point S. 50° E. (S. 53° E. mag.) clears Barrack and Ravient Reefs. The east side of the trees at Malcolm Point, N. 40° E. (N. 37° E. mag.), in line with the west end of the sand in Hunt Bay, and the highest point of the hills behind, leads westward of the reefs in $4\frac{1}{2}$ fathoms water.

The church, N. 79° E. (N. 76° E. mag.), in line with the north shoulder of Santa Cruz Mountains, and a little south of where they cut the hills behind them, leads to an anchorage in $4\frac{1}{4}$ fathoms sand and mud, with Hodges Wharf bearing N. 3° E. (north mag.). To a vessel approaching from the westward this mark leads clear of all shoals.

Vessels may anchor off the town in 3 fathoms, mud, with the church bearing N. 26° E. (N. 23° E. mag.) distant 1,400 yards. The clearing mark for the east side of Inner Barrack Reef is the south end of the trees at Malcolm Point, N. 50° W. (N. 53° W. mag.), in line with two large cotton trees to the southward of Font Hill House. During strong westerly and southwesterly winds a heavy sea rolls into the anchorage, making landing difficult and at times impossible.

Pilots take schooners of light draft and occasionally larger vessels in ballast to the anchorage by passing close to the eastward of the Barrack and Inner Barrack Reefs.

Ballast Ground lies to the west of a north and south line drawn through a large white house midway between the church and courthouse, and in less than 10 feet of water.

Black River flows from the north and east, through a large morass, and is navigable for 30 miles of its course; beyond are rapids and falls. There is a bar close to the river mouth, having $1\frac{1}{2}$ to 4 feet on it, the depth varying with the strength of the outpour. The water is fresh 3 to 5 miles up the river, according to the season of the year. The river abounds with fish and alligators.

The town of Black River stands on the west side of the river facing the bay, its church, courthouse, and hospital being conspicuous from seaward. It has a population of about 1,200, and, as a shipping port, it ranks third after Kingston. Poultry and yams are plentiful; fresh meat on Saturdays only. Good water is obtainable. Vessels always leave here, as also all other ports in Jamaica, before August 1, as after that date the insurance is doubled in consequence of the hurricane season beginning.

The sea water at Black River has a milky appearance, due to the nature of the bottom (fine sand and clay), while at Savannah-la-Mar,

20 miles to the NW., it is perfectly clear, enabling the bottom to be seen in 8 fathoms.

Coast.—From Luana Point the coast trends about NW. by N. for 2¾ miles to White House Point; it is steep-to and clear of offlying dangers, the depth of 100 fathoms being found at about a mile offshore.

Seals Cove, a small but well-sheltered loading place for cargo boats, lies about midway between Luana and White House Points; the entrance is not easily recognized by strangers.

There is a limited anchorage off the entrance to Seals Cove in 7 fathoms, sand and rock, with the large trees on Mount Edgecumbe open of White House Point; this anchorage is not recommended, and should not be taken without a pilot.

Anchorage.—Vessels may anchor off White House Point in 7 fathoms, mud, with that point bearing S. 87° E. (east mag.) distant 400 yards; the soundings decrease rapidly from the edge of the bank, but the holding ground is better than that off Seals Cove.

A pilot should be employed, as the anchoring ground is of small extent. Vessels occasionally load at this anchorage, but their cargoes are more usually conveyed in cargo boats to Black River or Savannah-la-Mar for shipment.

Pimento Point, distant nearly 3 miles from White House Point, has a reef extending a short distance from it. Between White House and Pimento Points the coast is fringed by offlying reefs, on the south side of which the depth rapidly increases.

Parker Bay, situated one mile eastward of Pimento Point, affords good anchorage for small vessels within the outer reefs, the channel through which, though not long, is narrow, and carries a depth of 2½ fathoms The basin inside deepens to 3¼ fathoms over sandy bottom.

Leading Marks.—To proceed through the channel between the outer reefs, bring the east extreme of wharf house in line with the western of two towers (which stand on a grassy slope ½ mile inland) bearing N. 10° E. (N. 7° E. mag).

Coast.—From Pimento Point the coast trends NW. by W. for 1⅝ miles to Crab Pond Point, which has a reef extending from it, and then NNW. for 1½ miles to Belmont Point.

Moor Reef.—This danger lies ¾ mile N. 47° W. (N. 50° W. mag.) of Crab Pond Point and ¾ mile offshore.

Black Spring Point, open west of Luana Point, bearing S. 47° E. (S. 50° E. mag.), leads nearly a mile SW. of Moor Reef.

Blewfields, about 2½ miles northward of Crab Pond Point, may be known by the church, schoolhouse, and the buildings on a large estate The anchorage is within the rocky ledge which lies about 1½ miles from the shore, and has a depth across it of 3½ to 4¾ fathoms; Luana Poin just open leads westward of it.

Water may be obtained at a small stream in Blewfields Bay, but :

more convenient place will be found around the bluff, at the north end of the bay.

Directions.—Standing in for the anchorage keep the overseer's house in line with the southern and lowest part of a deep hollow in the mountain bearing N. 71° E. (N. 68° E. mag.), which leads across the ledge in 3½ fathoms. As the water is very clear, any dark spots may be seen and avoided. When the ledge is crossed, keep to the northward with the Wesleyan Chapel about N. 26° E. (N. 23° mag.) for the anchorage in about 5½ fathoms. Vessels of large draft may anchor close to the west side of the ledge in 9 or 10 fathoms, but it must be approached cautiously under easy sail, as the ledge is steep-to. The land in this neighborhood is lofty, and 2½ miles inland rises to the height of 2,000 feet.

The soundings in this bay are irregular, over sand, rock, and weed.

The best anchorage is in 5 fathoms, with the Wesleyan Chapel on Friars Cap bearing N. 12° E. (N. 9° E. mag.) and the overseer's house bearing N. 82° E. (N. 79° E. mag.).

The overseer's house (which has a veranda) is situated on a hill about 150 feet high and ¼ mile inland.

Bluff or Paradise Point, situated NW. of Belmont Point, distant 4½ miles, projects ⅓ mile from the line of coast, and has a reef extending from its southern extremity.

From Bluff Point the reefs which form the south side of Savannah-la-Mar anchorage extend in a W. by S. direction.

Savannah-la-Mar may be readily distinguished by the town (an iron market being a prominent object), which stands on the shore of a low and flat plain of considerable extent. The ridge of hills bounding this plain on the north is very remarkable, and one of the peaks, called the Dolphin Head, also serves as a guide to the locality. The anchorage is formed by a line of reefs running alongshore and abreast the town, about 1½ miles off, with channels between them. The most conspicuous object in this town is a ruined fort at its southern extremity, surmounted by a tree and a small building.

A beacon is on the shore at the edge of the mangroves, 700 yards eastward of the fort.

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Supplies.—Provisions can be obtained, also good water.

Southeast Channel is a narrow opening in the outer reef about 70 yards wide, between a steep rock on the eastern side with less than 6 feet water on it, and two shoals of 10 feet and 6 feet water on the western side.

The beacon in line with the east side of Dolphin Head, bearing N. 11° W. (N. 14° W. mag.), leads through Southeast Channel in a depth of 19 feet smooth water.

Within this channel the depth increases to 3½ and 4 fathoms, over a bottom of sand and mud, shoaling gradually to the shore.

Lee Passage, 1¾ miles westward of Southeast Channel, is 800 yards wide, and has in it a depth of 4 fathoms.

The western side of Lee Passage is formed by a shoal (known as "Broad Stag" Shoal, close south of which a red buoy is moored in 4½ fathoms of water) of 9 feet situated 400 yards eastward of Great Breaker, and the eastern side by a coral reef with from 2 to 3 fathoms over it.

West Point, open south of St. Johns Point, bearing N. 67° W. (N. 70° W. mag.), leads ⅔ mile south of Great Breaker.

A detached house on the beach, ¾ mile westward of the fort, in line with a round hill (the highest which is seen eastward of Dolphin Head) bearing N. 12° E. (N. 9° E. mag.), leads through Lee Passage in mid-channel.

Vessels of light draft approaching from the westward can proceed to an anchorage immediately south of the town by bringing the beacon in line with a notch in the distant hills bearing N. 34° E. (N. 31° E. mag.); this mark leads in 2¾ fathoms between two shoals situated about 1,200 yards south of the fort.

When passing through Lee Passage, the notch should be kept open west of the beacon, and when proceeding between the two shoals it should be kept open just east of it.

The marks here given, except the beacon and Dolphin Head, are not readily made out. The Great Breaker always breaks. Strangers should take a pilot for either passage. Competent pilots may be obtained.

Vessels, when approaching this part of the coast, should on no account get into soundings unless intending to anchor at the ballast grounds outside the reef, as it is steep-to. With a strong trade this anchorage is by no means desirable, and risk will be run of losing an anchor. The west side of the plain of Savannah-la-Mar terminates a short distance NW. of St. Johns Point, and from thence to South Negril Point the land is of moderate elevation.

Coast.—Between Savannah-la-Mar and St. Johns Point the coast is fronted by an extensive bank of soundings, on which are numerous coral heads of from 2 to 3 fathoms.

Vessels, when approaching this part of the coast, should on no account get into soundings, unless intending to anchor off Hope Wharf, situated 1¾ miles eastward of St. Johns Point, which should not be done without the aid of a local pilot.

Between St. Johns Point and West Point the only places where landing can be effected are at Little Bay and Homers Cove, situated 2¼ and 3 miles respectively NW. of St. Johns Point.

Long Bay.—South Negril Point, the extreme west end of Jamaica, is bold, round, rocky, and steep-to, and between it and North Negril Point, which bears N. 12° E. (N. 9° E. mag.) 6 miles, the shore recedes and forms Long Bay, about 1½ miles deep. The edge of soundings runs

nearly north from the former point, and extends out about 2 miles from the head of the bay.

Sandy Reef, a circular reef ⅓ mile in diameter, lies N. 23° E. (N. 20° E. mag.) of South Negril Point, distant 2¾ miles; rocks and foul ground occupy the space between Sandy Reef and Booby Cay.

Anchorage.—Vessels can anchor in Long Bay in 4 to 5 fathoms, sand and rock, with South Negril Point bearing S. 20° W. (S. 17° W. mag.), distant 1½ miles, and the westernmost houses on the beach, situated nearly one mile within that point, bearing S. 8° E. (S. 11° E. mag.).

Booby Cay lies ¼ mile off shore, about 1½ miles to the southward of North Negril Point, and the coast between forms a small bay, called Negril Harbor, which, however, is seldom visited even by droghers, and can not be recommended as a safe anchorage. The ground both northward and westward of the cay for ½ mile is foul with rocky heads.

Coast.—From North Negril Point the coast, which is cliffy and about 50 feet high, trends NNE. for a distance of 1½ miles to Orange Point; this extent of coast is clear of off-lying dangers. It then continues in a northeasterly direction for 8½ miles to Pedro Point, a bold, prominent cliff which forms the NW. extreme of the island, and is somewhat similar to Pedro Bluff.

Orange Islet is a small islet lying close to the coast at ½ mile eastward of Orange Point; foul ground extends from it to the eastward.

Orange Bay, one mile eastward of Orange Point, recedes about ½ mile, but is too shallow to afford anchorage; the entrance to this bay is foul.

Coast.—Between Samuel Point, the eastern entrance point of Orange Bay, and Southwest Point, which bears from it N. 37° E. (N. 34° E. mag.), distant 1½ miles, the coast is composed of sand and rock.

Rhodes Bay is the local name of an indentation lying midway between these points; temporary anchorage may be obtained off this bay in 8 fathoms, sand and rock, with Southwest Point bearing N. 48° E. (N. 45° E. mag.), and Samuel Point S. 9° W. (S. 6° W. mag.); the edge of the bank on this part of the coast is steep-to.

Green Island Harbor is a small cove about 2½ miles NE. of Orange Bay. It is about ¾ mile deep, and little more than 200 yards wide between the reefs which skirt the shore on either side of the entrance, and is only fit for vessels of light draft. Being open to the northward, a heavy sea rolls in with these winds, rendering loading or unloading impossible, and bringing in sand which is said to be gradually filling it up.

Directions.—To enter this harbor bring the western side of a yellow house, situated on the beach at western side of the head of the harbor, in line with a house on a hill about 350 yards south of it, bearing S. 8° E. (S. 11° E. mag.) easterly; this mark leads close to the western edge of the reef which forms the east side of the harbor. On this line a vessel will carry a depth of 5½ fathoms between the reefs, and being within them

she may anchor according to draft. The soundings gradually decrease towards the shore, and with the inner wharf on the eastern side bearing S. 87° E. (east mag.) the depth will be only 15 feet; within this it shoals rapidly to 9 feet, with the fort on the west point bearing N. 87° W. (west mag.).

Coast.—Between the eastern entrance point of Green Island Harbor and Lances Point, a distance of 3 miles in a northeasterly direction, the coast is indented by three small bights, known as Negro Bay, Davis and Cousin Coves.

From Lances Point the coast, with two small indentations, trends NE. ¾ E. for 1½ miles to Pedro Point, and then in a more direct line a low rocky coast with hills rising behind it trends east for 2½ miles to the west entrance point of St. Lucea Harbor. Pedro Point is steep-to, but eastward of it the bank shoals more gradually to the shore.

Davis Cove is a temporary anchorage for droghers, lying about 2½ miles NE. of Green Island. All this part of the shore, with the exception of the immediate vicinity of Green Island, which is low and surrounded by reefs, being bold and steep-to a vessel may stand to within a mile of it.

St. Lucea Harbor, although of small dimensions, is one of the best harbors on the north side of Jamaica. Its entrance is about 600 yards wide, but, within, it sweeps round into a most picturesque basin capable of receiving vessels of the largest size. Its position may be readily recognized by the fort, church, and barracks, which stand near each other on the western side of the entrance. From an offing it will be found by bringing the Dolphin Head to bear about S. 8° E. (S. 11° E. mag.).

Lucea Point is a low rocky headland skirted by a ledge for 100 yards, and the eastern shore within it as far as Cane Point is also foul to the distance of 200 yards. A reef, which breaks, runs off S. 53° E. (S. 56° E. mag.) 200 yards from the fort on the western side; the western shore is also foul to about the same distance.

Supplies are good and water may be procured from the town, or at a well to the northward of Georgia River, on the east side of the harbor, at from 50 cents to $1 a ton.

Hospital Reef extends about 400 yards to the northward of Point Antonio; the great house at Point Estate, touching the southern cliffs of Lucea Point east (N. 87° E. mag.), leads northward of it.

Buoy.—A conical-shaped buoy, painted white, is moored in 2½ fathoms on the edge of Pit Bank, with the SE. extreme of the fort bearing N. 28° E. (N. 25° E. mag.), and Morley Hill House west (S. 87° W mag.).

Directions.—Approaching St. Lucea from the westward there is no danger except the Hospital Reef, but in running down from the eastward keep a good offing until past Buckners Reef, which lies about ½ mile from the shore and 2½ miles eastward of the harbor. Morely Hill

House shut in by the fort, clears Honeycomb Reef, but there is no object in rounding Lucea Point closely. Having opened the harbor, steer in mid-channel and when the courthouse comes open of Morley Hill, edge away to the SW. and anchor as convenient. A good berth for a heavy ship is with the fort bearing N. 19° W. (N. 22° W. mag.) and the courthouse (painted yellow, with a clock) in line with the Baptist Chapel S. 82° W. (S. 79° W. mag.), in 5¼ fathoms water. Farther eastward a vessel will be exposed to Northers, which at times send in a heavy sea. Vessels loading may go as far in as to bring the fort N. 9° E. (N. 6° E. mag.) in 3½ or 4 fathoms water. The bottom is mud. Should a vessel have to work out, in standing towards the eastern shore do not go farther than to bring the house on Barbara Hill in line with a house above it on Thorn Hill; but tack short of this line, especially near Cane Point, as it leads close to the coral bank.

To pass eastward of the reef extending eastward of Antonio Point, the west point of entrance, bring a detached house about 100 feet above the level of the sea, and situated ¼ mile west of Thorn Hill, in line with Dolphin Head, bearing S. 5° E. (S. 8° E. mag.), but it is a very close mark. The edge of the reef off the fort is, however, plainly visible, so that vessels can steer round it and anchor as convenient.

Coast.—Between Lucea Point and Mosquito Cove the coast is low, and composed alternately of sand and rock, with a bank of soundings extending to seaward for a distance of about ½ mile. South of Lucea Point, at a distance of one mile inland, the hills attain an elevation of 800 feet.

Mosquito Cove, about 3 miles to the eastward of St. Lucea, is a narrow well-sheltered inlet capable of receiving vessels of large draft. It is about a mile in length north and south, but at its entrance between the reefs which skirt it at a short distance on either side, it is little more than 100 yards wide; it, however, gradually widens within, and at its inner end forms a basin about 600 yards in diameter, in which the depth is from 3 to 2½ fathoms. A vessel will sail in with the sea breeze, but as no marks can be given, and the cove being so narrow, the assistance of a pilot will be required. In approaching, avoid the Buckners Reef, which lies about ¾ mile NW. of it at a long ½ mile from the shore, with a channel of 6 fathoms within it. A vessel may pass round either end of this reef, and soundings will be found ½ mile outside it.

Round Hill Bluff.—The bank of soundings to the depth of 100 fathoms extends about ½ mile north of Round Hill Bluff. Reefs extend about ½ mile from the shore between Mosquito Cove and Round Hill Bluff, and when working along this part of the coast, a vessel should tack before striking soundings.

Great River discharges itself into a small bay at about a mile to the eastward of Round Hill Bluff, a remarkable bold wooded headland, about 5½ miles to windward of Mosquito Cove, and the same distance

to leeward of Montego Bay. It is protected on the north by a reef, within which there is anchorage for two or three vessels of moderate draft. The anchorage off this river is used as a quarantine station for Montego Bay; the river may be recognized from the offing by a red bridge which spans it. In the event of being caught by a Norther in the bight of Montego Bay, and not able to fetch that anchorage or weather Round Hill Bluff, which is foul for nearly ½ mile off, a vessel may run for this place as a last resource by observing the following directions.

Directions.—Being off the anchorage, steer in for it on about a S. 26° W. (S. 23° W. mag.) bearing, and having made out the point of the reef, which shows itself, pass close round it, leaving it on the port-hand; then luff up, shorten sail, and anchor immediately the vessel is head to wind, as near the reef as possible, as there will be only room to veer out 100 yards, and be in 3 fathoms. It will perhaps be safer to drop both anchors at once, to prevent dragging. The river is navigable for flat-bottomed boats to a considerable distance.

Winds and Weather.—When seeking an anchorage off the north coast of Jamaica the possibility of a gale from the northward should always be borne in mind. These storms are most prevalent during the autumn and winter months, and are invariably accompanied by thick rain, squalls, and heavy seas.

Montego Bay.—From Round Hill the shore continues its easterly direction for about 5 miles, then bends suddenly to the northward for 3 miles, terminating in a low gradually rounding point (Montego Point), which may be said to form the north end of Montego Bay. The head of this bight is filled with low mangrove cays, known as the Bogue Cays, skirted by reefs to the distance of ¼ mile, almost wall sided, with 20 fathoms water at about 100 yards off. To the northward of the cays the low shore sweeps round with a slight inward curve, forming the bay, which between the reefs is nearly ¾ mile wide north and south, and from the town, on the eastern side of this bight, to the edge of soundings about ¾ mile deep.

The north and east sides of the bay are also foul to the distance of 400 yards. Between the town of Montego and Sandy Point the coast is formed by a rocky cliff about 20 feet high.

On the eastern side of the harbor, northward of the town, are the remains of a former breakwater, part of which is above water.

The ballast ground is situated in the SW. part of the bay. A railway is being built which will connect the town with Kingston. Population about 6,000. The Marine Hospital, on Old Fort Point, is a conspicuous object.

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Anchorage. The anchorage in the bay is quite safe during the period of the ordinary land and sea breezes, which range from NNE. to SE.; but between November and March, when Northers sometimes blow in

accompanied by a heavy sea, a second anchor may have to be dropped, and accidents have occurred.

Supplies.—Water and provisions of all kinds can be readily obtained at Montego.

Communication—Mail. There is a communication directly with New York by steamer, and the Government Postal Telegraph connects all the principal towns on the island.

Harbor Light. There is now a harbor light on Parish Wharf, showing a red light as a guide to the anchorage.

Direction.—Montego Bay being an open roadstead there is no difficulty in getting to the anchorage, except from its generally crowded state, especially from December to June. Approaching it from the eastward run down along the shore at the distance of about 2 miles, hauling gradually round the reefs, in 9 or 10 fathoms, which may almost be skirted by the eye, the water is so clear. Having passed to the westward of the point, haul to the southward along the reef, and when the church comes open bearing S. 65° E. (S. 68° E. mag.) the vessel will be southward of the SW. part of the northern reef. Anchor as most convenient, with Sandy Point, which is a little northward of Old Fort Point, shut in. Sandy Point just open of Old Fort Point leads along the edge of the bank, which is steep-to. A good berth will be with the church from S. 87° E. (east mag.) to N. 82° E. (N. 79° E. mag.) and Old Fort Point N. 2° W. (N. 5° W. mag.) in 10½ fathoms of water. In winter the farther to the northward the berth is taken the better, as the vessel will get the protection of the reef, but the holding ground is not so good. In anchoring be prepared to veer out a good scope of cable at once, or the vessel may drag off the bank.

The courthouse has a white tower and a clock; it is more conspicuous than the church and is likely to be mistaken for it. The church is nearly hidden by cocoanut trees; it has a dingy looking steeple and a clock. A new market place with a belfry is erected near the courthouse. The town is the largest on the north side of Jamaca; about 50 vessels visit it in each year.

The Coast from Montego Bay takes an E. by N. direction for 6 miles to Duns Point, the north extreme of Jamaica. It then trends a little southward of east for 10 miles to Falmouth. This part of the island, as far eastward as St. Ann, is generally low, highly cultivated, and backed by hills of moderate elevation. In beating up from Montego Bay, the set of the current should in the first place be found, and taken advantage of accordingly. Should there be none, keep the shore aboard during the evening, which may be done without fear, to catch the land wind. If it is found more advantageous to seek an offing, the mariner will find a good guide as to his progress to windward in the peak of Turquino, the highest and most remarkable mountain on the south side of Cuba, and generally visible.

Between Sandy Point (Montego Bay) and Falmouth Harbor the bank

of soundings to the depth of 100 fathoms extends about ½ mile from the shore. Numerous wharves have been built on this part of the coast, from which produce is conveyed by cargo boats to either Montego Bay or Falmouth Harbor.

Eastward of Montego Bay the hills, at the distance of 1½ miles inland, attain an elevation of 1,000 feet, maintaining generally that height until within 3 miles of Falmouth Harbor, toward which they gradually slope.

The shore reef extends generally about 400 yards from the coast, but off Long Bay (10 miles east of Montego Point) a depth of 3 fathoms is found at a distance of ½ mile off shore.

Falmouth, a reef harbor of considerable extent, is capable of receiving a small number of vessels not drawing over 16 feet, moored head and stern, and may be readily known by the public buildings of the town, which fringe the beach. Vessels drawing 18 feet have entered the port, and have departed drawing 19 feet.

The channel through the reef being extremely narrow and intricate, a pilot is necessary for a stranger. Though it is buoyed, yet the buoys occasionally break adrift. A beacon painted white, in the form of a pyramid surmounted by circular disks (to reflect the sun's rays), stands on the shore close eastward of the town, and greatly facilitates navigation. The land wind (with which only this anchorage can be left) is frequently interrupted for some days, but more especially so during the winter months. When once in the harbor the anchorage is a safe one.

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Buoys and Beacons.—A can buoy, painted in red and white vertical stripes, is moored in 13 feet on Hopewell Rock, with the courthouse bearing S. 59° W. (S. 56° W. mag.); Shore Beacon S. 14° W. (S. 11° W. mag.).

A red warping buoy is moored in 11 feet, northward of Spidér Reefs.

The SW. extremity of Middle Shoal is marked by a beacon consisting of a staff and triangle painted white.

The SW. extremity of Inner Shoal is marked by a white buoy.

The eastern side of the entrance is marked by a red and white striped buoy, placed on the western side of the outer reef.

Entrance.—The channel lies between the red and white striped buoy and West Triangle Rock, over which there is a depth of 13 feet water; midway between West Triangle Rock and the buoy is East Triangle Rock, with 19 feet water over it and 5½ fathoms close-to on either side.

Within the entrance the channel deepens to 7 fathoms, with reefs almost awash on either side, and turns SW. towards the courthouse. It runs thus for 400 yards and then turns south and east through either of three channels to the anchorage.

These channels pass on either side of and are formed by Middle or Whit and Inner or Harbor Shoals.

Hopewell Rock projects a slight distance into the channel from the center of the eastern side.

Middle Shoal is 80 feet long NE. and SW., 40 feet wide, and has 4 feet least water upon it.

Inner Shoal, slightly larger than Middle Shoal and lying SW. of it, has also a depth of 4 feet.

Harbor Rock.—At 100 yards south of Middle Shoal is Harbor Rock, a pinnacle having 18 feet of water over it, which rapidly deepens again all round to 4 fathoms.

Spider Reef.—This reef, extending from the point near the custom-house, forms the southern limit to the harbor.

Directions.—In entering the harbor carry small sail and con from the masthead. Bring the beacon on the coast line eastward of the town, bearing S. 20° W. (S. 17° W. mag.), in line with the NE. side of a house one mile inland, and proceed until the SE. corner of the court-house, bearing S. 59° W. (S. 56° W. mag.), opens north of the memorial stone of the Baptist Chapel behind it, when immediately keep away on that mark and enter the anchorage by the most convenient of the three passages, selecting a good berth in one of the tiers in which vessels are placed. The passage to leeward of Inner Shoal should be avoided unless the wind is well to the northward, or a vessel will not shoot far enough to windward to be well clear of Spider Reef on taking her cable. If arriving late in the afternoon (when the land wind may be expected at any moment), be prepared with stern moorings or a kedge.

Current.—When the sea breezes blow continuously for some days without the intermission of the land wind, there is at times, owing to the constant beat on the reefs and the amount of water forced into the harbor, a current induced which sets to windward through the anchorage and is strongest with the strongest winds. It is often the case that vessels are riding entirely by their stern moorings with their bower cables hanging up and down, the current being stronger than the wind.

Supplies.—Provisions are plentiful. A water pipe is laid at the edge of the harbor in a convenient place for watering. A water rate, according to tonnage, is levied on all vessels entering the harbor.

Ballast and Quarantine Ground.—The ballast ground lies off Fort Point, to which it must be sent in boats for discharge. The quarantine ground being at Great River (the same as for Montego Bay) renders it necessary to obtain pratique before entering the reefs, departure in a sailing vessel being impossible during the sea breeze.

Coast.—From Falmouth the coast is sandy and rocky alternately, trending easterly for 10 miles and then receding and forming the bay into which Rio Bueno empties itself; the small town of the same name being situated in the SW. corner of the bay. The 100-fathom line of soundings along this part of the coast lies barely ½ mile off shore, whilst immediately inland a gradual slope commences, attaining its highest point, 300 feet, about half-way between Falmouth and Rio Bueno,

towards which latter bay it again gradually falls; at 2 miles inland a range of hills from 800 to 1,000 feet high extends eastward from Martha Brae River as far as the gorge of Rio Bueno.

Rio Bueno, once an important shipping roadstead, may be recognized by some remarkable slate-colored bare patches on the face of bluff table-topped cliffs of from 100 to 150 feet elevation, lying one mile eastward of it; or by the church and houses in the SW. corner of the bay.

Anchorage.—It is not advisable to attempt this anchorage without a pilot or having previously sent in a boat to mark spots for each anchor. Mooring is recommended as the only protection against Northers or severe weather, and is necessary at all times with more than two vessels on the bank, in addition to a kedge astern. The best anchorage is with the east extreme of the sandy beach bearing S. 76° E. (S. 79° E. mag.) and the mouth of Rio Bueno bearing S. 48° W. (S. 45° W. mag.).

Water.—A plentiful supply of good water can be obtained at a short distance up the river. The port of entry for Rio Bueno is Falmouth.

Coast.—From Rio Bueno the coast curves gradually round for 2½ miles to another similar bight named Dry Harbor. Off this coast, which is rocky, soundings to the 100-fathom line extend for ½ mile, whilst immediately inland bluff cliffs rise perpendicularly 100 feet, shelve quickly for another 50 feet, and thence gradually slope to the highest point, 300 feet, midway between the heads of the two bights. The inland hills, having slightly decreased in height, again rise from Dry Harbor and from the gorge of the Rio Bueno, quickly attaining 1,000 feet elevation, at about which height and 2 to 3 miles inland the range continues to the eastward parallel to the coast.

Dry Harbor.—The conspicuous cliffs eastward of Rio Bueno serve to indicate the position of this harbor, it being situated 2 miles eastward of them. Across the mouth of the harbor stretches a coral reef, for the most part nearly awash; but at two-thirds of the distance across from the west side of the harbor is a narrow channel carrying 2¾ fathoms on the leading mark, with coral heads and shoal water close-to on either side of it. The only leading marks are, unfortunately, not at a sufficient distance from each other to be good. The channel is marked by two spar buoys, but little reliance can be placed upon them, and a stranger visiting the port for the first time should take a pilot. After crossing the bar the water rapidly deepens to 25 and 30 fathoms, but there is a shoal spit 700 yards south of the bar and close eastward of the course to the best anchorage.

Directions.—The best time for entering or leaving Dry Harbor is soo after daylight, before the sea breeze sets in, which causes a heav swell to set across the bar, especially with the wind from the NE., an would altogether prevent a vessel of more than 13 feet draft crossin, at those times.

To enter, bring the east side of the western of two storehouses o Knox Wharf, bearing S. 25° E. (S. 28° E. mag.), in line with the we:

side of the green veranda porch of the house close above and behind (Beverland House). This will lead between the two spar buoys if in place. Should one be adrift, great care must be exercised in determining which, for the channel lies only on the line of the leading mark and there is a depth of 1¾ fathoms close-to on either hand.

Anchorage.—A flat extends from the eastern shore of the harbor a distance of 300 yards, with depths decreasing from 18 feet, but the ground is rocky and foul, rendering it an undesirable anchorage even for small craft. In the south and SW. parts of the harbor, close to the shore, are three reefs awash with several rocky heads; this portion of the harbor has foul ground and the depth is too great to admit of convenient anchorage. The best anchorage is in the SE. corner of the bay, opposite Knox Wharf.

Supplies.—Provisions are plentiful and the harbor abounds with fish, but water can only be obtained at 2¾ miles eastward of the harbor, from Pear Tree Bottom, which boats can not approach during severe weather.

Runaway Bay, 5 miles further east, is a small open roadstead with a wharf. An unprotected anchorage may be obtained in 10 fathoms with the wharf bearing S. 30° E. (S. 33° E. mag.) distant 600 yards, and Flag Point, the eastern extreme of the bay, bearing N. 77° E. (N. 74° E. mag.).

Coast.—From Flag Point the shore takes an easterly direction for 6½ miles to the entrance of St. Ann Bay. Along this extent of coast many small streams and rivulets empty themselves into the sea. The western part is sandy, with a barrier reef extending about ⅛ mile from the shore, the descent to a depth of more than 100 fathoms outside the reef being very rapid; the eastern portion of the coast is rocky and steep-to, the soundings hardly extending ¼ mile off shore. Behind this coast the land for about a mile rises very gradually and is for the most part occupied by sugar plantations; thence it rises abruptly to an elevation of 1,500 and 2,000 feet, the height of Camerons Cap or the Camels Hump. St. Ann Peak, conspicuous when seen from a position 10 miles to the northeastward, is 2,130 feet high.

St. Ann Bay may be recognized by the buildings of the town, situated on a gradually rising hill; by a large waterfall 3 miles to the eastward of the town and only visible when seen from the eastward, or by its position with regard to St. Ann Peak or the Camels Hump. The harbor is a basin formed in the coral reef 400 yards in diameter, with a narrow but deep entrance carrying 11 to 14 fathoms, which gradually decreases in depth to the southward. Vessels require to moor head and stern, and should select a berth towards the western side of the harbor to obtain during Northers the full protection of the reef. On the western side of the anchorage, and detached from the main reef, is a heap of ballast, over which there is only 6 feet water. To the southwestward of this anchorage there is a small arm suitable for small

coasting vessels. During heavy weather a similar current and attributable to the same cause as at Falmouth is here experienced. This current running through the anchorage from the west causes ships that are not well moored head and stern to lay broadside to the sea, and to roll most uncomfortably.

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Supplies.—Provisions are plentiful and water may be obtained from Drax Hall River.

Land Wind.—A strong north wind or the continuous blowing of the sea breeze at times prevents sailing vessels leaving the port for some days, a wind off the land being necessary, but fore and aft vessels can beat out in a moderate sea breeze.

Directions.—To enter, bring the east road of the town, leading from the beach up the hill, open, when the east side of the customhouse (which is the most easterly building on the water line) will bear S. 6° W. (S. 3° W. mag.) and be just clear of the west side of the Wesleyan Chapel on the hill. When past the western reef, which is plainly visible, anchor as convenient. The above marks for entering are not easily made out in consequence of the trees grown about the Wesleyan Chapel, and the east road being overgrown with grass. The best leading mark to enter by is, house on hill with a black patch in the middle of it (Mr. Black's house, the black patch is a window, with a black veranda, when coasting steamers come in a white light is exhibited there) in line with crane on second eastern pier. There are two small spar buoys laid down outside the reefs to mark the channel, but they can not be seen till close to them.

Coast.—From St. Ann Bay the coast curves gradually round to ESE. for 1½ miles into Mammée Bay, and thence ESE. again for 3¼ miles to Ocho Rios. Mammée Bay has a fringing reef extending from the shore, and some prominent red cliffs at its eastern extreme, near which a river flows into the sea. The falls of this river at a short distance inland are plainly visible from seaward, and are of some extent. From Mammée Bay to Ocho Rios the coast is rocky with occasional sandy beaches, and has many small waterfalls along it of from 10 to 30 feet in height.

Ocho Rios Bay.—To enter the bay, Bull Rock Point (on which there is a conspicuous wall close to the water) should be steered for, bearing S. 14° W. (S. 11° W. mag.) until Dollars Pier bears S. 53° E. (S. 56° E. mag.), when the pier should be steered for on that bearing. Anchor in 7 fathoms, with the west extreme of the reef bearing N. 26° E. (N. 23° E. mag.). Small vessels might anchor 200 yards nearer the church, in 4½ fathoms, with the west extreme of the reef bearing about N. 8° W. (N. 11° W. mag.).

The bay is protected from all winds except those between north and WNW., and it is considered one of the healthiest places on this coast, possibly from the absence of lowland.

Ocho Rios is situated at the bottom of a bay, from the eastern entrance point of which a plainly visible reef extends to the westward, affording partial shelter. The inner part of the bay is to some extent narrowed by a reef that runs out from the south side of the anchorage. It is easy of approach, the best berth being in 3½ fathoms, with the only wharf (which extends from a zinc circular-roofed warehouse) bearing S. 53° E. (S. 56° E. mag.), and the western extremity of the reef awash, bearing N. 20° E. (N. 17° E. mag.).

Ocho Rios is in telegraphic communication with Kingston, mails are received and dispatched three times a week, and the usual provisions can be obtained.

Supplies.—Provisions are plentiful, and water is obtainable from any of the springs that discharge themselves into the harbor.

Coast.—From Ocho Rios the coast, which is rocky alternating with sandy bays, trends E. by N. for 3½ miles, past White River mouth to Frankfurt Point, with soundings extending off to the 100-fathom line for ¾ mile. At Frankfurt Point it alters in direction to E. by S., and rises in bluffs of 60 to 100 feet in height for 2 miles to Rio Novo, where there is a small unprotected anchorage close to the shore and steep-to.

Ora Cabeza, situated S. 79° E. (S. 82° E. mag.), distant 3 miles from Rio Novo, is a better anchorage than Rio Novo, having a depth of 10 fathoms, mud, with the NW. extreme of a small islet at its eastern part bearing N. 71° E. (N. 68° E. mag.), distant 400 yards; it is, however, open and exposed to the north and west.

Coast.—The coast from Rio Novo consists of cliffs 30 to 40 feet high, off which soundings run for a short distance. At the eastern extremity it curves round slightly with a sandy beach in the bight, on which the small village of Ora Cabeza stands. From St. Ann Bay the land continues to rise immediately beyond the coast line, but decreases its comparative altitude, attaining 1,660 feet at 1½ miles inland from Ocho Rios, while at the same distance south of Frankfurt Point it is barely 800 feet high, and decreases in elevation again toward Ora Cabeza. From the bight in which the latter village is situated to that in the bottom of which lies Port Maria, the coast line is low and rocky, with hills rising gradually behind to a height of from 400 to 500 feet. It is steep-to, and may be approached by vessels beating to windward with perfect safety. From Ora Cabeza the shore curves NE. ¾ E. for one mile, then runs easterly for 3 miles to Gallina Point, from whence it trends to the southward for a distance of 2 miles to the town of Port Maria.

Port Maria is divided into two portions by Cabrita Island. The town is situated on the shores of the western part, in which is the best anchorage, the other portion being at present seldom used on account of the decrease in sugar cultivation. The shore between Gallina Point and the town forms a shoal bay, and is covered with a forest of cocoanut trees, which serve to indicate its position from a distance.

Directions.—To enter, a vessel should carry easy sail and steer midway between Fort Point and Cabrita Island, with the westernmost wharf bearing S. 26° W. (S. 23° W. mag.), and be prepared to anchor shortly after Pagee Point (the eastern entrance point) is shut in by Cabrita Island. Cabrita Island is fringed for a distance of 150 to 200 yards from the shore with reefs and foul ground, which must be borne in mind when shooting up after rounding to.

Supplies.—Provisions are easily obtainable. Good water is supplied by pipes.

Quarantine.—The quarantine ground of Port Maria is at Ora Cabeza.

Pilots are generally to be found some miles outside.

Coast.—From Pagee Point the land behind is bold, quickly rising to a height of 800 and 1,000 feet; the coast runs, with some small bays and coves, in a SE. by E. direction for 4½ miles to Blowing Point, whence it trends SSE. for 4 miles, and then ENE. for 1½ miles to Free Point, the bight between Free and Blowing points being known as Annatto Bay.

Sheerness Bay is small, with a coral-fringed harbor for droghers and lighters, open to the NE., and lying one mile south of Blowing Point.

Jacks Bay, with a shipping wharf, lies 1¼ miles south of Sheerness Bay.

Wag Water River.—The mouth of this river lies ½ mile NW. of Grays Inn Wharf in Annatto Bay.

Annatto Bay.—The town in this bay is situated close to the beach, and is easily recognizable by its stores and the church in the NE. corner within a mile of Free Point. At the SW. end of the town is situated Grays Inn Wharf, with an estate at the back; close to Annatto Bay Church is situated Gibraltar Wharf.

Schoolmaster Shoal runs to the northwestward from Gibraltar Wharf and turns to the eastward toward Free Point, affording to some extent protection to the anchorage during the usual sea breeze, but none from Northers.

Anchorage.—The best anchorage is as close to the northeastward and to Schoolmaster Shoal as possible, with Gibraltar Wharf bearing S. 65° E. (S. 68° E. mag.), distant 550 yards. This position is a good one from which to leave for sea on the approach of a Norther; there is good holding ground along the east side of the bay, but its extent rapidly narrows to the southwestward.

Directions.—If entering from a position to windward, do not run down within one mile of the shore nor haul to the southward until Grays Inn House is open westward of Grays Inn Wharf, bearing S. 42° W. (S. 42° W. mag.). A vessel is then clear of the extreme of Schoolmaster Shoal and may run S. 48° W. (S. 45° W. mag.) until abreast the proposed anchorage. The bank shoals very rapidly, and, as vessels should invariably moor, the port anchor must be dropped in about 7 fathoms with plenty of cable ready, and the other anchor let go in abo

5 fathoms, whilst the kedge should be ready for running out astern to hold during land winds.

Buff Bay.—From Free Point the shore trends E. by S. for 2½ and 3¾ miles to Dover and Palmetto Points, respectively, past the bights forming Fort Stewart and Fig Tree Bays, which are very foul for ½ mile off shore. Between Palmetto and Savannah Points, Buff Bay is formed by the shore trending SE. for 3½ miles, and then E. by N. for 2¾ miles. The western part and bottom of this bay are very foul, and break in 5 and 6 fathoms at ¼ mile offshore, the bottom being composed of rocky pinnacles.

Roadstead.—Off Spring Garden wharf, 2¼ miles west of Savannah Point, a vessel would find anchorage in 12 fathoms, mud, at 300 yards N. 26° E. (N. 23° E. mag.) of the wharf; this anchorage can not, however, be recommended, being on a lee shore during Northers, and unprotected from the sea raised by the ordinary sea breeze. The bank is very steep-to, and rapidly shoals from the anchorage, the quality of bottom changing from mud to stones and gravel. It is, in fact, only suitable for droghers, as is also a small spot off Orange Bay close to Savannah Point.

To the eastward of Wag Water River, at Annatto Bay, the land rises very rapidly from the coast into well-defined hills that inland form the spurs of the Blue Mountain Range. The intervening ravines are deep, with small fertile plains at their coast termination; they contain rivulets and streams which, during heavy rains, deepen into rivers and torrents, preventing communication and sweeping away the shingle barriers on the beach that are thrown up by the surf.

Coast.—Between Savannah Point and Ship Rock (a distance of 6½ miles in an E. by S. direction) there are two bights forming Hope and Saint Margarets Bays, in the bottoms of both of which there are anchorages for droghers and boats only. Along this coast the 100-fathom line lies from ½ to ¾ mile off the shore, which is very steep-to. The coast range rises in places to a height of about 800 feet; between these hills and the Blue Mountain Range is a fine valley, formerly cultivated with sugar, but now rapidly growing into bush again. The Rio Grande rises to the eastward of the Blue Mountains, and, flowing NW. through a deep valley, empties itself into St. Margarets Bay.

Ship Head, a prominent bluff point, lies eastward of Ship Rock.

Port Antonio is divided into two harbors by a narrow peninsula which takes a northerly direction nearly ½ mile from the main, with a curve to the NE. The town of Titchfield stands upon it, and at the north end there is a fort and barracks, which are conspicuous objects from the offing.

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Western Harbor.—It is approached from the eastward through a narrow but deep channel about 100 yards wide, which is marked by two iron can buoys, between Navy Island and the main, and there is

also a narrow outlet to the northward through a tortuous channel with 2 fathoms water in it, but useless for any but small cargo boats; this harbor can only be left with a land wind. There are wharves alongside of which vessels drawing 20 feet can come.

The sunken wreck of a steamer in Western Harbor, near the alignment of the leading beacons, is marked by a green buoy, surmounted by a cage. The buoy lies in 7 fathoms of water southeastward of the wreck.

Vessels must anchor westward of a line joining two cocoanut trees with whitewashed trunks, situated on the southern end of Navy Island, and must use a buoy rope sufficiently heavy to lift the anchor. No ashes, ballast, or rubbish of any kind is permitted to be thrown overboard.

Beacons and Buoys.—Two truncated pyramidal beacons, painted white, are on the western side of West Harbor. The west beacon is about 100 feet above the level of the sea; the east beacon is situated close to the beach. These beacons in line lead through the channel between Navy Island and Titchfield Peninsula. Lights are placed on these beacons when a mail steamer is expected.

The entrance is marked by two buoys, one red and one black. The red buoy lies on the northern side of entrance with Folly Point lighthouse N. 69° E. (N. 66° E. mag.), and the church S. 8° W. (S. 5° W. mag.). This buoy is particularly liable to drift, and neither buoy can be depended upon. The black buoy on the southern side of entrance lies with Folly Point lighthouse N. 59° E. (N. 56° E. mag.), and the church S. 5° W. (S. 3° W. mag.).

Eastern Harbor.—The eastern harbor, divided from the western harbor by Titchfield Peninsula, can be left with either a land or sea breeze. It has good holding ground in from 10 to 6 fathoms for large vessels, but, being open to Northers which send in a heavy sea, it is not so much frequented as the inner harbor.

The entrance between the east extreme of Navy Island and Folly Point is 600 yards wide, but being foul for 100 yards on either side, the working ground is narrowed to 400 yards.

There is no landing place in Eastern Harbor.

Rock.—A small rock lies 50 yards off Rover Point, which is situated 134 yards south of Folly Point. With this rock in line with Folly Point and Titchfield Point bearing N. 41° W. (N. 44° W. mag.), anchorage will be obtained in 9 fathoms of water.

Supplies.—Provisions are plentiful, and good water is obtainable from pipes, the town having a regular water supply.

Telegraph.—There is telegraph communication with all parts of the world.

Repairs.—The Boston Fruit Company has a machine shop at which ordinary repairs can be made.

Light.—On Folly Point, from a lighthouse 50 feet high, a fixed red

light is shown at an elevation of 54 feet, and is visible 13 miles between N. 81° W. (N. 84° W. mag.) and S. 54° E. (S. 57° E. mag.).

Light Dues.—The following rate of fees are to be paid as light dues by vessels entering or calling at Port Antonio:

Steamers, 2 cents per registered ton, not payable oftener than once in any three months.

Sailing vessels of any tonnage, not being droghers, $4 on each clearance.

Droghers, 50 cents, not payable oftener than once in any three months.

The above fees shall be paid by all vessels except Government vessels and pleasure yachts.

Directions.—Eastern Harbor. There is no danger in entering, and the eastern or weather point is bold-to. Keep in mid-channel between Folly Point and Navy Island and then haul over toward the fort on the north end of Titchfield Peninsula, to avoid the shoal ground on the east side of the harbor, and approach the anchorage under easy sail, as there is no room to shoot far in. As a heavy swell sets into this port, sailing vessels ought not to weigh for the purpose of proceeding to sea without being well satisfied that the land breeze extends to a sufficient distance for the depth of water at the entrance is so great as to render anchorage quite unsafe should the breeze fail.

To enter the Western Harbor, run in under easy sail, and when within or abreast Folly Point edge away gradually until the beacons are in line, and stand in on that line until the harbor is opened, when haul up and anchor in 6 or 7 fathoms. There is a slight set from the Eastern Harbor towards the reef off Navy Island, on which is a depth of 7 and 8 feet; this must be borne in mind when proceeding either way through this channel in light winds.

Coast.—From Folly Point (close to the eastward of which is situated Woods Island, about 150 yards in extent and 15 feet high) the general direction of the coast is E. by S. for 4¾ miles to King Point, passing the droghing stations of Turtle Crawle, Cold Harbor, and Blue Hole. Soundings extend for a very short distance off shore, the bottom being coral and rock. Eastward of King Point is situated Boston Bay, open to the trade and north winds, and with a foul bottom except in its SW. corner, where is a patch of sandy bottom that affords an anchorage for small coasting vessels.

From NE. End (the NE. extreme of Jamaica) to Morant Point the general direction of the coast is SE. by S., the distance being 17 miles with Manchioneal Harbor lying about midway and Plantain Garden Bay lying N. 50° W. (N. 53° W. mag.) 3 miles from Morant Point.

Priestman River Bay lies one mile southward of NE. End, and Long Bay 2½ miles. They are both steep-to, soundings to the depth of 100 fathoms, over rock and sand extending off shore for about ½ mile. Being on a dead lee shore, neither of these bays is available as an anchor-

age. The cliffs that fringe them rise perpendicularly from the water to 20, 30, and 40 feet in height.

Manchioneal Harbor.—This harbor, at the south extreme of a cocoanut plantation 2 miles long on the coast, is very small. A reef, extending from Nettle Point on its north side, narrows the entrance to a width of 100 yards, which leads to an anchorage close off Shipton Point, barely exceeding 200 yards in diameter. From this anchorage to the northward is a narrow, well-protected haven for small craft. It is 100 yards wide at the entrance, with 5 fathoms, and gradually shoals inwards. Vessels should moor in the southern anchorage in about 7 fathoms, and as from its small size the placing of the anchors is of great importance, a pilot should be taken.

Supplies.—Provisions are plentiful, and water is obtainable a short distance up the Drift River, which, during heavy rains, swells and causes a strong off-set through the harbor and entrance.

Red Cliffs.—Between Manchioneal Harbor and Plantain Garden Bay are some remarkable red cliffs at South Booby Point, which will serve to indicate the position of either place.

Plantain Garden Bay.—To the southward of the Red Cliffs the shore bends in to the SW. and forms a deep bay, skirted by a reef, at the head of which is Plantain Garden River, 3½ miles N. 70° W. (N. 73° W. mag.) of Morant Point.

Anchorage.—Between the reefs off the mouth of the river and the shore there is a roadstead, where the telegraph cables from Santiago de Cuba and from St. Thomas are landed. This bay can not be recommended as an anchorage, on account of its exposed position and the difficulty of getting away on the setting in of a Norther or NE. wind, caused by the rapidity with which the bottom shoals from deep water to the broken and foul ground fringing the coast.

Coast.—The general nature of the coast from Port Antonio to South Booby Point is cliffy, with little sandy coves interspersed, off which rocky and foul ground generally extends. But from South Booby Point the land commences to fall and trends into Plantain Garden Bay, then sweeping round SE. again towards Morant Point.

From Port Antonio a range of hills commences to rise gradually towards the direction of Morant Point, attaining on the bearing of S. 71° W. (S. 68° W. mag.) of Manchioneal Harbor and at 4 miles inland a height of about 3,000 feet and running almost parallel to the coast, towards which by degrees they fall. From the summit they fall more rapidly to the southward and terminate at Plantain Garden Rive thence to Morant Point being an almost level plain.

Current.—Along the north coast of Jamaica the prevailing curre is to the westward with the trade wind, varying from ½ knot to 1½ kno an hour, with the strength of the wind; this prevailing current is occ sionally replaced by a slight easterly set, most observable, but not ways so, during the moon's second quarter.

Pedro Bank.—This bank, within a depth of 100 fathoms, is about 100 miles long in an east and west direction, and 55 miles broad at the western part; the breadth in a north and south direction at 25 miles from the eastern limit is only 9 miles, and the eastern extremity terminates in a point in lat. 17° 7′ N., long. 77° 19′ W.

The bank rises abruptly from depths of 250 and 350 fathoms, and the edge (which is very steep-to) is of white limestone, on which are found sponges, branching coral, and corallines.

The surface of the bank is tolerably level, having over it depths of from 6 to 20 fathoms, except near the southern edge, which is dangerous of approach, and where there are numerous rocks, cays, and shoals; the northern and western parts of the bank are clear of dangers.

The bottom is generally of white sand and dead coral, but occasionally it is composed of weed and live coral.

At the NW. part of the bank the bottom is of a somewhat reddish color.

Over the eastern extreme of Pedro Bank, even in moderate weather, the sea is generally rough with overfalls; over other portions of the bank the sea is not higher than in deep water.

Shoals having less than 3½ fathoms can be seen from aloft as discolored water, unless the sun is in line with them or the sea rough. From Portland Rock for 50 miles along the SE. edge the bank is studded with dangers. The cays on the bank are dependencies of Jamaica.

In rounding the east end of the Pedro Bank a good berth must be given to it, as the current generally sets strongly to the westward.

Portland Rock has a double summit; it is 290 yards long and appears double when bearing either east or west. A ridge, over which there are irregular soundings, extends ½ mile N. 26° W. (N. 29° W. mag.) from the rock.

Position.—From numerous observations made on and near Portland Rock the position has been determined as follows: Lat. 17° 6′ 20″ N., long. 77° 27′ 10″ E.

Anchorage.—A vessel seeking temporary anchorage may slowly approach the western side of Portland Rock and anchor in 8 fathoms, clear sand, within a distance of 400 yards from it; westward of this position the depths increase to 10 and 12 fathoms.

Landing on Portland Rock is very difficult.

Blower Rock.—Blower Rock, lying S. 48° W. (S. 45° W. mag.) of Portland Rock, distant 5¼ miles, is about 20 yards long and 2 to 3 feet high.

This rock is steep to on the eastern side, where a depth of 6 fathoms is found close-to; a spit having from 3 to 5 fathoms on it extends nearly a mile NW. from the rock.

In ordinary weather the sea breaks heavily on Blower Rock, and the column of water sent up can be seen from a considerable distance.

Caution.—Vessels should not cross the Pedro Bank between Port-

land Rock and Shannon Shoal without having local knowledge, nor under any circumstances should they do so at night.

If crossing Pedro Bank through the channel eastward of Blower Rock, vessels should pass within 3 miles west of Portland Rock.

If crossing westward of Blower Rock, unless the breakers on that rock are clearly seen, it is advisable to sight Shannon Shoal.

A small shoal, with a depth of 2 fathoms over it, lies S. 35° W. (S. 32° W. mag.) of Blower Rock, distant 1,200 yards.

Shannon Shoal.—This dangerous shoal, which within a depth of 3 fathoms extends one mile in an E. by N. and W. by S. direction, lies on the southern edge of Pedro Bank, at about 14 miles S. 68° W. (S. 65° W. mag.) of Portland Rock. In calm weather it uncovers about 1½ feet for a length of 50 yards near the western extremity, but during rough weather or even in a moderate sea, the shoal is covered with breakers.

Shannon Shoal shelves evenly to a depth of 6 fathoms, but beyond that depth irregular soundings are found for a distance of 2 miles in a northerly and NW. direction. If approaching from the southward, the soundings would not give sufficient warning of approaching this danger.

The steamer Shannon was wrecked near the eastern extremity of this shoal, and in October, 1880, a portion of the machinery was still to be seen rising over 20 feet above the sea, and forming an excellent beacon, which on a clear day was visible from a distance of 7 miles.

Shoal.—An extensive shoal, over which there is a depth of 4¾ fathoms, coral and weed, lies N. 19° W. (N. 22° W. mag.) of that part of Shannon Shoal which uncovers, distant one mile.

Caution.—The edge of the bank between Shannon Shoal and Northeast Cay forms a remarkable curve inwards. No attempt should be made to cross this part of Pedro Bank.

Pedro Cays.—These four cays, known respectively as Northeast, Middle, Southwest, and South Cays, are situated near the southern edge of Pedro Bank, at about ½ mile within the depth of 100 fathoms. These small islets (of which Southwest Cay is the largest) are dependencies of Jamaica, and are rented by merchants in Kingston for the purpose of collecting guano. Temporary huts have been erected on these cays, close to which the best landing places will be found.

Cocoanut trees have been planted on Northeast and Southwest Cays, but they do not yet rise above the bushes.

Northeast Cay.—This cay lies S. 76° W. (S. 73° W. mag.) of Portland Rock, distant 18 miles; it is about ⅓ mile long in a NNW. and SSE. direction, and 160 yards broad, being covered with bush tops of which are 12 feet above the water.

The large cocoanut tree formerly standing on this cay has been down.

From the SE. extreme of Northeast Cay a reef which breaks to the southwestward for a distance of ⅓ mile.

Anchorage.—Vessels can anchor in 5 fathoms over sandy bottom, with the NW. extreme of Northeast Cay bearing N. 71° E. (N. 68° E. mag.); but there is generally an uneasy swell at this anchorage.

Shoals.—A shoal with 6 feet water over it lies N. 73° E. (N. 70° E. mag.) of the south extreme of Northeast Cay, distant 2 miles; and a shoal with 3½ fathoms over it lies N. 54° E. (N. 51° E. mag.) of the same point, distant ⅔ mile.

Two small shoals, each about 50 yards in extent, lie N. 42° W. (N. 45° W. mag.) of Northeast Cay; the outer of these, with 2½ fathoms over it, is always visible from aloft, and lies nearly 1⅓ miles from the cay; the inner, with 2¼ fathoms over it, is 1,800 yards distant. A third shoal, of about the same extent, with 3½ fathoms over it, lies N. 25° W. (N. 28° W. mag.) of the cay, distant ½ mile.

Clearing Mark.—The east extreme of Southwest Cay (seen from aloft), open the apparent length of that cay west of Middle Cay, bearing S. 20° W. (S. 17° W. mag.), leads NW. of these dangers.

Vessels approaching from the northward and having cleared the shoals, may pass between Northeast Cay and Middle Cay into deep water.

Middle Cay.—This cay, about 12 feet high, lies S. 48° W. (S. 45° W. mag.) of Northeast Cay, distant 2½ miles, and is covered with brushwood. From the SE. extreme a reef, which generally breaks, extends to the southward, and is continued as a rocky ridge in the direction of Southwest Cay, forming a protection to the anchorage.

Anchorage.—Anchorage will be found in 5 fathoms, bad holding ground, with the west extreme of Middle Cay bearing S. 87° E. (east mag.), distant ⅛ mile.

Shoal.—A shoal of 2½ fathoms water, with a depth of 5 fathoms close-to, lies N. 31° W. (N. 34° W. mag.) of Middle Cay, distant ½ mile.

Great numbers of fish has been observed in the vicinity of this danger.

Southwest Cay.—This cay is about ⅛ mile long in a NNW. and SSE. direction, and is partially covered with bushes, which attain a height of 12 feet above the sea.

A reef awash fringes the eastern side of this cay, and foul ground extends from it for a distance of ⅔ mile towards Middle Cay.

Position.—The SE. extreme of Southwest Cay has been determined to be in lat. 16° 59′ 25″ N., long. 77° 49′ 10″ W.

Anchorage.—Good anchorage may be obtained westward of Southwest Cay in any required depth, but small vessels desirous of anchoring se in should carefully avoid the spit extending from the north side this cay.

A vessel leaving the anchorage off Southwest Cay, and intending to ceed to the southward, should pass east of South Cay.

Water.—The center of Southwest Cay is slightly depressed, and ter may be procured by sinking a cask, but it is brackish.

South Cay.—This cay, lying S. 23° W. (S. 20° W. mag.) of the south extreme of Southwest Cay, distant 2⅔ miles, and about a mile within the southern edge of Pedro Bank, is 220 yards long in an east and west direction, and 8 feet high, being composed of dead coral of white appearance.

There is clear ground both eastward and southward of South Cay, but shoal water extends about a mile northward and westward from it.

There is no anchorage off South Cay, and landing can seldom be effected on it.

The channel between South Cay and Southwest Cay is available for vessels, provided that South Cay is not approached within a distance of 1¼ miles.

Shoals.—A shoal bank, which, within a depth of 5 fathoms, is about 3 miles long, lies about ½ mile within the southern edge of Pedro Bank, at 4 miles westward of South Cay.

Two shoal heads are situated upon this bank at a distance of 1½ miles from each other; the eastern of these (at ½ mile within the eastern edge of the bank), with 6 feet of water upon it, breaks in moderate weather, but the western shoal head, with 12 feet over it (lying nearly one mile within the western edge of the bank), seldom breaks; between these shoal heads there is a general depth of 4 and 4½ fathoms.

A dangerous reef, over the center of which there is a depth of 6 feet, lies about 10 miles S. 68° W. (S. 65° W. mag.) of South Cay, and 5 miles N. 71° E. (N. 68° E. mag.) of Banner Reef, north extreme. This reef, within a depth of 5 fathoms, is 1½ miles long, and probably breaks in heavy weather, but not in a moderate sea.

In the center of the channel between this reef and Banner Reef there is a depth of 8 fathoms.

A depth of 100 fathoms is found 1¼ miles SE. of this reef.

Banner Reef.—This danger, lying S. 68° W. (S. 65° W. mag.) of South Cay, is just awash, and in a smooth sea might show no indication of its existence; during a fresh breeze the sea breaks over a space extending about 1½ miles in a NNE. and SSW. direction.

Numerous shoal heads, with sandy bottom between them, lie within a distance of one mile northward and westward from Banner Reef, and this part of Pedro Bank should not be approached under any circumstances.

At ½ mile southward of Banner Reef there is a depth of 65 fathoms.

Southwest Rock.—This rock, lying S. 65° W. (S. 62° W. mag.) of Banner Reef, south extreme distant 5½ miles, is about 50 yards l and 3 feet high, with a depth of 10 fathoms close-to on the south side, and 5 fathoms on the northern side; it lies within 1¼ miles of southern edge of Pedro Bank.

A spit, having from 5 to 6 fathoms over it, extends N. 19° W. (N. W. mag.) from Southwest Rock for a distance of ¼ mile.

Southwest Rock is very dangerous, as in fine weather the vicinity is only indicated by ripplings.

Northwest Ridge.—Two shoals, over which there are depths of 8 fathoms, lie ½ mile within the southern edge of Pedro Bank, in long. 78° 33′ W. and 78° 38′ W., respectively.

Tides.—It is high water, full and change, on Pedro Bank at about 8h. 45m.; springs rise about 1½ feet.

Current.—The general set of current over the eastern part of Pedro Bank is to NW., attaining its greatest velocity when the trade wind is strongest, but seldom exceeding the rate of one knot an hour.

In calm weather the flood tidal stream sets to SSE., but is easily overcome by a slight breeze.

The ebb stream apparently sets to NW. as soon as the moon has passed the meridian.

In moderate weather a slight southerly set may therefore be expected for 5 hours preceding the moon's upper or lower transit, and a strong set to NW. for the next seven hours.

Over the western part of the bank the currents set to NNW. and to SW., having a tendency to the northward on the north edge of the bank and to the southward on the south edge; the velocity, which varied from ½ knot to 1¼ knots an hour, was affected by the wind.

No easterly set was observed during the survey in 1880 on this part of the bank.

Bajo Nuevo, or New Bore, about 95 miles S. 37° W. (S. 33° W. mag.) of Portland Rock, is oval-shaped, about 14 miles in extent, and 5 miles in breadth. Two extensive reefs rise from the bank; the eastern one, close to its edge, is a solid semicircular reef, convex to the eastward, dry in places, with its horns curving along on the north and south sides of the bank for about 2½ miles, and at the southern termination is a dry sand bore. It is steep-to, the edge of soundings being about ¼ mile off, except at the northeastern end, where it is about one mile off.

The Southwestern Reef, somewhat similarly formed, is separated from the Eastern Reef by an opening about one mile wide, and it trends along the southeastern edge of the bank for 7½ miles from the southwestern extremity of the eastern reef, and near its termination is a sand bore. A shallow ledge, with 10 fathoms water close to it, runs off to the westward of the bore for about 1½ miles to within 2 miles of the SW. end of bank, which makes this termination of the reef, if possible, more ngerous than the other. Small ridges of sand occasionally form on ier parts of the reef, but they disappear in strong breezes.

Low Cay.—On the northern point of this leeward reef, which is irly in the middle of the bank, there is a barren cay, composed of d, broken coral, and drift wood, thrown up by the sea to the height 5 feet. It is 300 yards long, about 50 yards wide, and lies in lat. ° 53′ 00″ N., long. 78° 39′ 04″ W. On it there is a small pond

which is resorted to by seals, and in the months of March and April the bank is visited by fishing vessels from St. Andrew and Old Providence for the purpose of taking them.

To the westward of the eastern reef the north side of the bank is clean for about a mile within its edge as far as about 2 miles westward of the cay. There is also a clear space of about 3 miles on the western side of the bank. The depths vary from 8 to 17 fathoms of water, over coral and sand. Care should be taken when standing toward the broken ground on the north side of the leeward bank, as a coral head lies S. 74° W. (S. 70° W. mag.) 2 miles from the cay. The northern edge of the bank is also so steep that the first cast of the lead may be 12 or 15 fathoms. The bottom is visible. The current in the vicinity of this reef sets strongly to the westward, at times as much as 2 miles an hour.

Anchorage may be taken up in moderate weather in 8 fathoms water with the cay bearing S. 75° E. (S. 79° E. mag.) distant about 1½ miles, but it is exposed to the winter breezes.

The Caymans.—These three islands, lying to the northwestward of Jamaica, and in the track of vessels sailing from that island to Cape St. Antonio, in the island of Cuba, are between the meridians of 79° 44′ and 81° 26′ W., and the parallels of 19° 14′ and 19° 46′ N. The westernmost island is named the Grand Cayman, from its being the largest; the second the Little Cayman, and the easternmost the Cayman Brac.

Grand Cayman Island is low and irregular, and can only be seen from the deck of a moderate sized vessel about 12 miles. Its SE. end forms a rounded bluff cliff, topped with trees to the height of about 40 feet above the sea. The SW. end is low and sandy, and at 400 yards southward of it is a small sandy cay, about 2 or 3 feet out of water, from which a reef which generally breaks on the greater part runs off ½ mile; it therefore requires great caution when rounding this end of the island, especially at night, as the lead will give but short warning. The NW. extreme is similar to the SE.; the NE. end is somewhat lower.

The island is almost everywhere thickly wooded; and on all sides but the west is skirted by a reef, which is steep-to, to the distance of from ¼ mile to one mile. At the east end it forms a solid barrier to the distance of one mile, and the sea breaks on it heavily at all times. There are several small cuts through the reef on the south side, which admit the small vessels of the island into shelter within. The lar[ge] opening is on the north shore near the NW. end, and it leads [to] North Sound, which is shallow and of considerable extent. The [re]church, and a small village is scattered along the shore of the b[ay] the SW. end of the island, but the principal settlement is at Bo[dden] Town, which stands about midway on the southern shore. In 187[3] island contained about 3,000 persons.

Two companies are established on the island for the export of phosphate of lime. The English company has a pier at the NW. point and the American company one about ⅔ mile to the northward. Moorings have been laid down in about 15 fathoms, for a vessel of about 800 tons, northward of the American company's wharf.

Anchorage.—The only anchorage for large vessels at the Grand Cayman is under the west end, about 1¼ miles northward of the SW. point. Care, however, should be taken to pick out a clear sandy spot, which can be easily done by the eye, and shoot in under easy sail, for the soundings do not extend more than about 400 yards from the shore, and the edge is very steep. A clear berth will be found with the church S. 83° E. (S. 87° E. mag.), and the SW. point S. 6° W. (S. 2° W. mag.) in 7 or 8 fathoms, but if it is merely to communicate, a vessel had better remain under sail.

Caution.—As before stated, great care must be taken in rounding the SW. point to give it a berth of at least a mile, until it is brought to the eastward of north. In leaving the anchorage with the usual trade wind, it will be better to heave the anchor up before making sail, to prevent dragging at a short stay, for the holding ground is not good, and the anchor in tripping might catch under a shelf of rock and be lost or broken.

Supplies.—This anchorage is a convenient place for obtaining wood and stock, except cattle, which are not always to be had at the moment; turtle is generally in abundance, and is the chief commerce of the island. Strangers approaching are met off the south side at a considerable distance by canoes having them for sale. Water is obtained from wells at about 100 yards from the beach, but it is scarce.

Cayman Bank, which lies about 10 miles westward of the Grand Cayman, is a remarkable ridge of coral and sand, taking an ENE. and WSW. direction, with a slight curve to the SE. It is 5 miles long, but scarcely ½ mile broad, with a depth of from 15 to 20 fathoms; on the edge the lead drops off suddenly into more than 100 fathoms water. By keeping a good lookout the discolored water may be seen, and sometimes it may be detected by a strong current ripple.

Little Cayman.—This island is 9 miles long in an ENE. and WSW. direction, and about one mile broad; it is covered with bush, and has two small hills on it about 50 feet high.

When seen from eastward, the most conspicuous part of the island is Weary Hill, 45 feet high, situated a mile from the east extreme.

Sparrowhawk Hill, 48 feet high, near the north shore, about midway between the east and west extremes of the island, appears as a double peak when seen from northward or southwestward; Cleft Tree Clump on the south shore is also a conspicuous object. Sand Cliff Point, near the east extreme of the island, appears as a white patch when seen from Cayman Brac.

South Coast.—The south coast of the island is sandy, and for the most part skirted by a reef on which the sea constantly breaks; it is steeper than the northern side of the island, and the bottom is foul. The bank of soundings to the depth of 100 fathoms extends generally ½ mile off shore on the south side of the island, and there are no off-lying shoals. Off Sand Cliff Point the bottom within a depth of 7 fathoms is irregular.

South Hole Sound.—There is a passage through the fringing reef, the entrance to which can be seen from aloft, leading to a reef harbor (South Hole Sound) opposite the village, situated 2 miles from the SW. extreme of the island; this passage is available for large boats and schooners.

Anchorage.—During the winter months, when the prevailing winds are from northward, anchorage may be obtained on the south side of the island in 7 fathoms, on a white patch off a rocky ledge one mile eastward of Southwest Point, and where the coral reef joins the shore line. A vessel should approach this anchorage carefully, and anchor with the south extreme of Southwest Point bearing N. 86° W. (west mag.) and a conspicuous cocoanut tree bearing N. 4° E. (north).

The coast at this part is not fringed with reefs.

Should the wind veer to the eastward it would be prudent to leave this anchorage for that at Anchorage Bay on the NW. side of the island.

North Coast.—The north coast of Little Cayman Island is partly fringed by a reef, but there are several fair anchorages.

Anchorage Bay, about ½ mile north of Southwest Point, affords good holding ground in from 8 to 10 fathoms water, off a rocky coast which is steep-to.

A vessel should anchor where the bottom appears white, with Southwest Point bearing S. 27° W. (S. 23° W. mag.), and Jackson Point in line with the eastern extreme of the bay.

Jackson Point, 3 miles eastward of Southwest Point, has on it the only large clump of cocoanut trees on this side of the island. A vessel may find shelter with Jackson Point bearing N. 72° E. (N. 68° E. mag.) in 8 fathoms, but within that depth the water shoals rapidly.

Reef Harbor.—At the NE. extreme of the island there is a small harbor within the reefs, capable of accommodating schooners drawing from 8 to 9 feet, but it is much encumbered with rocks.

A quiet anchorage, during southerly and easterly breezes, may be found outside North Reef, with East Point bearing S. 58° E. (S. 62° E. mag.).

Cayman Brac.—This island, situated 4 miles eastward of Little Cayman, is 10½ miles long in an ENE. and WSW. direction, about 1½ mi in breadth, and covered with thick bush.

It rises abruptly from the sea at the Northeast Point, to a height

130 feet, decreasing gradually towards the western end, the cliff terminating one mile from Southwest Point. The top of the island is flat, and intersected by a few rugged paths.

Northeast Point is steep-to, having 7 fathoms close to the shore. The sea breaks on the point, giving it the appearance of shoal water.

The south coast of the island is skirted by a broken reef.

The bank of soundings within 100 fathoms extends off shore about ½ mile, except at the NE and SW. points, where the distance is increased to nearly one mile. There are no offlying shoals, but within the depth of 5 fathoms there are occasional coral bowlders rising about 6 feet from the bottom; this is especially the case in Stakes Bay.

Anchorage.—The best anchorage is in Scott Bay, in 9 fathoms, about ½ mile N. 49° E. (N. 45° E. mag.) of Southwest Point; with Scotts Settlement bearing S. 7° E. (S. 11° E. mag.); and the high land at Stakes Point nearly shut in with Frenchman Point. Stakes and Bight Bays, also on the north side, are quiet and safe anchorages outside the depth of 5 fathoms. Should the wind shift to the northward, anchorage may be found on south side near Southwest Point, care being taken to find a clear spot for the anchor as the bottom is full.

Caution.—Vessels anchoring on the north side are recommended to ride with a short scope of cable, as the weatherly set of the current is liable (if riding with a long scope) to cause the chain to foul the coral heads, which, in the event of a squall, would bring up the vessels very short.

Care must be taken to avoid the turtle nets when about to anchor.

Population.—The population of the Lesser Caymans is about 300, principally Scotch. The men work in companies, fishing and turning turtle at Little Cayman, but residing at Cayman Brac, where their plantations are. The produce is dried and sent to Jamaica by schooners.

Supplies.—Boats will come off to vessels hove-to off the north shores of the islands, and will probably bring off turtle, yams, and fruit. Water, which is generally brackish, may with difficulty be obtained from the wells attached to the houses on the islands, by application to the owners.

Winds and Weather.—Summer winds range from ENE. to SSE. Rainy weather sets in about the middle of May and continues till August. Heavy squalls are prevalent from east and ENE. in June, coming on suddenly at or before midnight. From November to April the direction of the wind is from NE. to north, seldom varying for more than 48 hrs. There is at that time very little smooth water, and landing is difficult. When the land winds are strong on the coast of Cuba, the swell rolls across and breaks heavily on the northern shores of these islands.

Tides.—It is high water, full and change, at Lesser Caymans at 8h. ; springs rise 18 inches.

Pickle Bank, in latitude 20° 23′ 20″ N. and longitude 80° 29′ 52″ W., is of an irregular shape. The outer edge of the shoal is clearly marked when immediately over it, and is plainly visible from a boat running along it. On the edge there are from 13 to 20 fathoms of water, and one boat's length outside of the bank there is no bottom at 35 fathoms.

When directly over the bank the white coral with the dark spots of grass can be plainly seen, but 20 yards away the water has the appearance of the rest of the sea.

CHAPTER IX.

HAITI.

The Island of Haiti, comprising two Republics, viz, Haiti on the east and Santo Domingo on the west, is rich and beautiful, the second in size of the West India Islands; it is very irregular in form, being deeply indented with bays and inlets and corresponding projections, the most remarkable of which forms the southwestern extremity.

Three connected chains of mountains intersect the island from west to east, and between these ranges are extensive plains and savannas. The principal range of mountains, called the Cibao, runs in an east and west direction from Cape Nicolas to Cape Engaño.

Mount Yaque is its highest peak, near the center of the island. Almost parallel with this chain another, commencing near Monte Christi, runs in an easterly direction, skirting the north coast, and terminating abruptly on approaching the peninsula of Samaná. To the eastward of this range are low, marshy grounds, interlaced by estuaries and channels which formerly separated Samaná from the mainland and afforded communication from the gulf of that name to the sea on the north shore of the island; the heights, however, reappear on the opposite side of the low ground and terminate in Cape Samaná.

La Vega Real lies between these two mountain ranges, affording rich and extensive pasture lands.

The third and most southerly mountain range commences at Cape Tiburon, and extends to the eastward, terminating at the River Neiva, about 80 miles west of the city of Santo Domingo.

All the streams of Haiti of any importance originate in the great central mountain chain. The principal rivers are the Artibonite, flowing west; the Monte Christi, or North Yacki, northwest; the Yuma, flowing southeast; and the Neiva, or South Yacki, the Nisao, and the Ozama, flowing south. The mouths of all these rivers are obstructed by sand bars, and hence few of them are navigable. The Ozama, however, admits vessels drawing 10 feet.

Mineral springs of various kinds exist in different parts of the island.

The mineral products are various and very rich, including gold, platinum, silver, quicksilver, copper, iron, tin, sulphur, manganese, antimony, and rock salt.

All tropical fruits and vegetables grow in abundance, and coffee, sugar, cotton, indigo, and tobacco can be plentifully raised.

Timber of all kinds is abundant, including pine, mahogany, oak, satinwood, lignum-vitæ, and many other species.

The seaports are all or nearly all very unhealthy, yellow fever being a constant attendant during the hot season.

The island was discovered by Columbus on the 5th of December, 1492. The boundary line between the two Republics is very irregular and is in dispute, but is generally considered to run from the mouth of the River Massacre, in Manzanillo Bay, on the north, to the Creek Anse-a-Pitres, or Pedernales, on the south coast, in about longitude 71° 50′ W.

The people are almost entirely of the negro race, and speak a Spanish dialect in Santo Domingo and a French patois in Haiti.

Winds and Seasons.—The winds in the island vary according to the trend of the different parts of the coast.

The rainy season continues from the end of May until November. In this season gusts and storms are frequent; at the same period strong SE. winds are experienced in the bay of Gonaives and in the channel of St. Marc. In November, December, January, and February the winds are from the NE., variable to NW., blow with force, principally on the northern coast of the island.

On the southern coast frequent storms occur in June, July, and August, in which the winds come from the south and are violent principally from that direction.

On the entire coast of this island the sea breezes blow, their direction varying according to the trending of the land. The sea breeze commences from 8 to 9 a. m., increases until midday or 4 p. m., when it diminishes and gives place to the land breeze, which lasts until 4 or 6 o'clock in the morning.

The general track of hurricanes lies to the northward of this island, occasionally, however, during the hurricane season, from July to October, they blow with terrific force.

Ports of Entry. Charges—Santo Domingo.—The coast is imperfectly surveyed. Many of the ports at which vessels call for cargo are not charted, and masters of vessels are compelled to rely on the pilots, who for the most part are ignorant and know little of the English language. The ports of entry for imports and exports are Santo Domingo, Puerto Plata, Azua, and Samaná. Monte Christi is a port for export only. Vessels taking cargo on the south and east coasts, enter and clear at Santo Domingo and take a pilot; also a number of laborers, to assist in handling cargo. The pilot acts as stevedore and is paid from $1.50 to $1.75 per day, Sundays and fast days included. The labor receive from 75 to 87½ cents per day, all being subsisted by the ve while they are on board. The pilot directs the laborers, who work lighters. Europeans not accustomed to work in the water are quently taken sick, and vessels will meet with quicker dispatch b ploying laborers and not exposing their crews, little accuston work in the tropics. The port charges are moderate. Vessels

enter under the following circumstances are free from port charges, unless they take water or a pilot, for which they pay as is stipulated, viz:

(1) Vessels of war, foreign or domestic; vessels that arrive with emigrants, and those that enter to repair damages, or to sell part of their cargo to supply their wants, without doing any other business.

(2) Those that enter and clear in ballast, or to procure provisions, to try the market, or on account of bad weather, to make repairs, or other causes, on condition that they do not discharge or take cargo on board.

(3) Vessels that, on account of damages, discharge a part or whole of their cargo, which, if it was sold according to law, would have to pay the same port charges as other vessels, but if the cargo is reexported in the same vessel, without any part being sold, they would pay only 2 per cent storage on the value of the cargo as determined by the appraisers. They would also pay the "derecho de muelle," also pilotage and water if they are taken.

Samaná Peninsula—Cape Samaná.—The east end of this peninsula terminates at Cape Samaná, which forms a bold double cliff of moderate elevation, the upper rising a short distance within the summit of the lower. These cliffs, which are red and steep-to, extend about 2 miles to the south, where the land is 833 feet high abreast of Vaca Point. At about ⅓ mile southward of Vaca Point and close to the shore there is a remarkable spout, resembling continuous jets of steam, occasioned by the rush of water into a subterranean cavern. This spout has been seen when 7 miles southward of it. At about 3 miles to the westward of the cape, between Balandra Head on the south and Cape Cabron on the north, the peninsula is 10 miles across, and this is about its general breadth. A small reef on which the sea breaks extends off Cape Samaná.

Cape Cabron.—The shore between Capes Samaná and Cabron, 4½ miles apart, forms a deep bight, in which are several small cays, skirted by a reef. The latter cape also terminates in a remarkable white perpendicular cliff, and 5 miles to the SW. of it is a cone shaped peak 1,926 feet above the sea, to the SW. of which peak are two others close together, 1,658 and 1,830 feet, respectively, and 2 miles south of these two latter is Mount el Pilon de Azucar, a conspicuous peak, reaches 1,612 feet above the sea. This part of coast should not be approached within 3 miles.

The Coast from Cape Cabron trends W. by S. about 23 miles to kson Point, 6 miles beyond which it turns almost suddenly to the thward for 25 miles to Cape Viejo Frances. Between the two for- points there are several small bays and beaches, whence, in favor- e weather, mahogany is shipped in droghers, but there is no safe horage for large vessels. The western shore of this great bight is lly barren and uninhabited, and affords no shelter whatever.

Port Jackson affords tolerable anchorage for vessels of moderate size, being somewhat sheltered by the cay and reef of the same name. The entrance is open to the NE., and is said to be clear of danger, except a shoal in mid-channel, easily seen, and having deep water on both sides. There are some large cays or rocks 4 miles eastward of the entrance, and still farther to the eastward are some others. The entrance to the harbor is said to be abreast of a remarkable white rock. Near the port and westward of it is the mouth of the Grand Estero River, which formerly joined the Yuna River at the head of Samaná Bay. The entrance to the river affords anchorage moderately well sheltered, with depths of from 5½ to 11 fathoms.

Port Matanza, in the southwestern portion of Escocesa Bay, is easily entered, but is only fit for small vessels. On the southern shore of the bay there are some small anchorages, where in fine weather coasters may load mahogany.

The other ports in the bight are Moretes, Galeras, Rincon, Escondido, San Juan, l'Hermitano, Limon, Pechems Point, and the mouth of the Lateriana River.

Cape Viejo Frances is bold, lofty, and visible 30 miles off. About 20 miles S. 34° W. (S. 34° W. mag.) of it there is a remarkable large mountain named Quita Espuela, which may be seen at the distance of 45 miles, and from off Cape Cabron it has the appearance of a detached island. As it is approached, the land will be seen to slope gradually down to the cape. A very similar ridge branches off to the eastward, and when at a few miles from the shore its termination may be mistaken for the true cape; the extreme pitch of the true cape, however, is rather low, and there are some rocks and foul ground near it. A little to the westward of it, in a small bay, there is anchorage for small vessels.

Cape la Roca is about 10 miles westward of Cape Viejo Frances, and between them the coast is low, steep, and thickly wooded, and being foul, should not be approached within 3 miles. From Cape Roca the shore extends about WNW. for 20 miles to Macoris Point, which is high and steep-to. To the westward of the point is Port Santiago.

Between Cape La Roca and Macoris Point are the small ports of Macoris, Grosse Pointe, Ananas, Soufriére, and Cabaret.

Soufriére affords anchorage for vessels of considerable size. The western channel is the better one of the two cuts through the reef which shelters the anchorage. Most of the other ports are only boat harbors.

The River Yasica empties into the sea 3½ miles SE. from Port Ca[illegible]. There is absolutely no shelter here, and no vessel can anchor [illegible] safety. The mahogany cut in this vicinity is taken by land to Port [illegible]aret and shipped from there.

Port Cabaret is about one mile wide at the entrance, formed by [illegible]aret Point on the east and Goleta Point on the west side. [illegible]

latter point a dangerous reef stretches off in a SE. direction toward Cabaret Point. Outside this reef, to the northward, is a sand bank with 2½ fathoms of water on it, and also a rocky bank with 1¼ fathoms.

The passage in between the reefs is about 60 yards wide, with depths of 3½ to 5½ fathoms. Nelsons Reef and an offlying rock lie in the middle of the harbor.

Vessels of 400 tons visit this port, anchoring in 4 to 5 fathoms of water within 300 yards of the shore. The holding ground is not good. Before entering it will be well to buoy the points of the reefs. The tide rises 2 feet.

The coast between ports Cabaret and Plata is bordered by reefs, and should not be approached nearer than 2 or 3 miles.

Puerto Plata is the only port of entry in this part of the island. Its locality is easily recognized by a high isolated mountain called Isabella de Torres, and having a conspicuous white spot on it. Westward of the mountain, at a distance of 4 or 5 miles, are some small conical hills. The harbor is semicircular in form, with a low, sandy beach, and affords anchorage. On the eastern point there is a hill with a fort on it, near which, to the southward, is the town.

The port is not much of a harbor for large vessels and it is not safe to let vessels swing. Steamers after anchoring moor head out with stern lines to one of the three mooring buoys. The chart is incorrect, and is only a general guide to the harbor. The number of wrecks show that it is an exceedingly dangerous port, and a stranger entering without a pilot risks the losing of his ship. The wreck of the Alsatia is a good landmark; two vertical cylinders stand well out of water and can be readily distinguished when approaching the harbor. The most dangerous obstruction for lightdraft vessels is the wreck of the Tiber, which has from one to 4 feet of water over it, and lies in about 2½ fathoms water. It was this wreck that caused a Spanish gunboat to be lately wrecked. The wreck of the Tiber lies 815 yards S. 32° E. (S. 33° E. mag.) of Owen Rock (center) and the gunboat 320 yards S. 47° W. (S. 46° W. mag.) of the Tiber.

The large wharf has 7 feet water at the end of it and is very much out of repair. At present it is of no commercial value. It was formerly longer, but owing to the heavy seas heaving around East Point, could not be kept in repair. About 150 feet off the end of the wharf there is a rock with but 5 feet of water on it. The small wharf is only used as boat landing.

The population is about 4,000.

The United States is represented by a consul and vice-consul.

Owen Rock.—At the entrance is a rocky islet and readily distinished at 3 or 4 miles off.

Calla Rock.—Is a most dangerous obstruction at the entrance; it is lated and surrounded by deep water. The least depth over it is 18½ t. The soundings in its vicinity range from 10 to 11 fathoms and on

the rock change abruptly from 10 to 6, from 6 to 4, and from 4 fathoms to 18½ feet. The rock is not more than 40 feet in diameter; the shoalest spot is only a few feet in diameter. There is usually a considerable swell over the rock which makes it dangerous for comparatively light-draft vessels. The rock lies 900 yards N. 9° E. (N. 8° E. mag.) of the lighthouse.

Steamers.—Steamers to New York, Europe, Cuba, and Puerto Rico make regular trips.

Port Charges.—Tonnage dues $1 per ton, gold; entry, 6 cents per ton; anchorage, 6 cents per ton; doctor's visit, $2; interpreter, $2 to $4; signals, $2 to $4. Steamers pay the same tonnage, but other dues are one cent instead of 6. Light dues one cent for steamers and 6 cents for sailing vessels per ton register.

Pilots.—Pilotage not compulsory. When taken, steamers pay one cent and sailing vessels 6 cents per ton register.

Light.—On the hill near the signal station a flashing light is shown at an elevation of 137 feet above the sea, and should be visible 16 miles. The light shows a flash of 10 seconds duration every 50 seconds.

Water and Supplies.—Two small streams empty themselves at the head of Puerto Plata, and in the rainy season cause a strong outset; at this period the River St. Mark, in the western port of the harbor, is open for boats, and is the best watering place. In the dry season the eastern rivulet would be the most convenient; but the water casks must then be rolled up about ¼ mile and rafted off; at times the swell makes watering very difficult. Wood will be found on the western shore. Provisions are cheap and plentiful.

Winds.—In the winter at Puerto Plata the sea breeze sets in strong from the ENE. about 9 a. m. and continues until near sunset, when a moderate land wind comes off from the southward. It is remarked that Northers seldom blow home into the port.

Directions.—When at a distance of 2 miles from the coast, and running in for Puerto Plata, bring the Fort Point in line with the west end of the peak of Isabella de Torres bearing S. 20° W. (S. 19° W. mag.), and continue on this course until Owen Rock, just outside the western reef, bears N. 67° W. (N. 68° W. mag.); then steer S. 31° W. (S. 30° W. mag.), which leads in through the channel, a little more than 200 yards wide, and for which the eye is the best guide. The soundings in the channel are regular, but just within the points it shoals very suddenly, and there are only 2 fathoms at ¼ mile from the head of the harbor; vessels of moderate draft must therefore be prepared to anc immediately between the entrance points in about 5 fathoms wate

The reef skirts the coast for some miles to the westward of the po but within a short distance of Patilla Point the land may be approacl to the distance of a mile, but there is no anchorage.

Tides.—It is high water, full and change, in Puerto Plata at 7h. 3 and the rise is about 3 feet. The coast tidal current sets across the ance to the harbor.

Patilla Point, 12 miles westward of Puerto Plata, is a lofty bold headland, and readily distinguished; a reef runs off it for about 800 yards, and at ¾ mile from the shore are 10 and 11 fathoms water. Thence the coast line trends about W. by N. 11 miles to Cape Isabella, the north extreme of Haiti, on the east.

Cape Isabella.—From off Patilla Point, Cape Isabella has the appearance of a low, thickly wooded island, with some remarkable palm trees on its north end; a small reef runs off about 200 yards from it. A short distance eastward of the cape is Puerto Caballos, a reef harbor, reported to be more commodious than Puerto Plata, with, however, but 10 feet of water in the entrance. About 5 miles farther east is the anchorage of Azufre.

Isabella Bay.—To the westward of the cape is Isabella Bay, open to the north and NW., but affording good anchorage and easy of access. A good berth will be found with a bottom of mud and sand in 4½ fathoms of water, with the north point bearing N. 46° E. (N. 45° E. mag.), about 1½ miles distant. Small vessels may anchor closer in shore, but the depths are irregular, with a reef and several sunken rocks in the way.

Supplies.—Fresh provisions, wood, and water may be procured here.

Estero Balsa Arriba or Port Juanita.—This harbor is about midway between Cape Isabella and Monte Christi. A reef extending east and west along the entire coast line, at about 2 to 2½ miles from the shore, has two natural openings at this place, one at the eastern end of the port, the other at the western end, each affording a passage through the reef.

Within the above mentioned reef is a tranquil harbor, with deep and safe anchorage everywhere. Vessels of from 10 to 12 feet draft may safely approach to within a very short distance from the shore.

The eastern channel is wide, with depths of from 8 to 14 fathoms, excepting a small sand bank in mid-channel, with 2 fathoms over it and having deep water on either side.

Fresh water cannot be obtained, but when proceeding to this port a supply can be obtained at Monte Christi.

There is said to be anchorage under Arenas Cay in 5 or 6 fathoms and 1½ miles off shore; also under Rucia Point, 3 miles farther east, in 12 fathoms water, sheltered by the reef off it, as far around as NNW.

Jicaquito Bay.—To the eastward of Point Granja the shore recedes to the SE., forming between it and Fragáta Point a deep bight, called Jica-
to Bay, nearly 2 miles broad and 1½ miles deep, which is reported to
rd good anchorage, protected by a reef extending off from the latter
nt; the sea breaks at all times on the reef, the end of which is N.
E (N. 22° E. mag.), about one mile from the eastern end of Granja
l. The eastern part of the anchorage is very shoal, and on entering
s necessary to keep over towards Granja Hill. The head of Jicaquito
y is low and swampy, and there is said to be a water communication
ween it and Monte Christi. Tides rise 3 feet.

Granja Point is a bold headland about a mile in length, and forms the extremity of the small peninsula of Monte Christi. It lies about S. 85° W. (S. 84° W. mag.), 38 miles from Cape Isabella, and is readily distinguished by a remarkable hill near the shore, about 800 feet high. Its flattened summit has the appearance of a large barn, and, being seen long before the land in its neighborhood, will be found a useful object to vessels beating up from the westward.

Monte Christi Bank extends from Cape Isabella to the westward as far as 12 miles NW. of Granja Point, then sweeps to the SW. and joins the shore again at Manzanillo Point. It has never been thoroughly surveyed, and urgently needs examination. Within its limits are several islets, rocks, and shoals; until a more complete examination has been made, great caution must be used in passing over or near it. On this bank the water is discolored, the depth uneven, and the nature of the bottom very variable, being generally coral or coarse sand near the edge and mud nearer the shore.

Granja or Haut Fond Banks are two small patches near the edge of Monte Christi Bank. The innermost, which bears N. 29° E. (N. 28° E. mag.) about 6½ miles from Granja Point, is about ¼ mile in extent, and has as little as 23 feet water on it, with from 12 to 25 fathoms around. The other lies about a mile N. 22° W. (N. 23° W. mag.) of this, close to the edge of the bank, and N. 18° E. (N. 17° E. mag.), 7½ miles from Granja Point. It is very similar in extent to the former and has a depth of 6 fathoms.

Monte Christi Shoal lies about west, 9 miles from the Granja Banks, with Granja Point bearing S. 50° E. (S. 51° E. mag.) 9 miles; and the western edge of the bank distant 3 miles. It is about ¾ mile in length, and composed of detached small pointed rocks upon a white sand bank, with as little as 2¾ fathoms on them, and from 4 to 7 fathoms between the heads.

Phaeton and Liverpool Shoals.—Phaeton Shoal, a little over 2 miles distant from Fraile Islet, is 300 yards long east and west, and 200 yards broad, with a depth of 3¼ fathoms over it. Liverpool Shoal, ⅜ mile N. 39° W. (N. 40° W. mag.) of Phaeton Shoal, is 700 yards long, 200 yards broad, and upon it there are from 2½ to 4 fathoms. About 100 yards north of the eastern end of Liverpool Shoal is a smaller patch of 5 fathoms with 10 fathoms close-to.

Granja Point, bearing S. 72° E. (S. 73° E. mag.), leads one mile southward of these dangers, but very close to the 17-foot shoal recently reported.

Dangerous Shoal.—The existence of a shoal with 17 to 18 water over it has been reported in the fairway of approach to Mo Christi Bay, on the following bearings:

Granja Point S. 72° E. (S. 73° E. mag.).

Center of Monte Grande Islet S. 24° W. (S. 23° W. mag.).

The shoal is not indicated by the color of the water and about ¼ mile westward of the danger the depth is over 10 fathoms.

Fraile Islet, about 30 yards from the extreme of Granja Point, is an excellent landmark; there is no passage even for a boat between it and the point.

Cabra Islet, lying about 600 yards SW. of Granja Point, is 33 feet high and partly covered with trees; there are low bluffs at its north and south ends, the middle is low, and it is scarcely distinguishable from the mainland when approached from the westward, until close-to. A reef extends 400 yards to the northward of this islet, on which the sea does not always break. In the passage between Cabra Islet and the shore there are 1½ to 2 fathoms of water.

Cay.—Nearly one mile S. 12° W. (S. 11° W. mag.) of Cabra Islet is a small rocky cay, northward of which is a bank divided into two parts by a narrow channel of 2¾ fathoms, which is buoyed, but the positions of the buoys in this anchorage are not to be depended upon.

Monte Christi Anchorage.—From Granja Point the coast takes first a southerly and then a southwesterly direction about 5½ miles, as far as Yuna Point. In the bight is the anchorage and town of Monte Christi, which is overlooked by a remarkable hill crowned by Fort San Francisco, more than a mile from the shore. When seen from the NNW., at about 5 miles distance, the summit of the hill has the appearance of a saddle with several white spots on its declivities. There is also a small fort on the shore to the westward of this, and two others between it and Granja Point. The River Yaque formerly discharged itself a short distance to the SW. of the village, and supplied it with water, but it has changed its course within the present century, and now flows into Manzanillo Bay, about 10 miles farther southward.

Anchorage.—There is an excellent anchorage between Cabra Islet and the rocky cay. There are no hidden dangers in this vicinity except a small shoal, with from 2½ to 4 fathoms over it, ¾ mile to the westward of the anchorage.

This anchorage is completely protected from the trade winds, which blow constantly during the day in summer time, and the water is very smooth.

Five fathoms will be found on a line between the islet and the cay, eastward of which the water gradually shoals towards the shore and the bottom becomes soft; ½ mile westward of this line there is a depth of 6 or 7 fathoms.

Directions.—If bound to Monte Christi from the eastward, steer
n Cape Isabella for Granja Point, making allowance for the inset of
current, and round it less than one mile distant to avoid the inner
aeton Shoals.

n approaching the anchorage from the westward, Granja Point
uld be brought to bear S. 73° E. (S. 74° E. mag.) and approached

on that bearing, thus keeping to the southward of the Liverpool, Phaeton, Monte Christi Shoals, and the new 17-foot shoal.

In navigating off this part of the coast, when steering to the westward, if it is desired to pass to the northward of all the offlying dangers just described, from a position 12 miles north of Cape Isabella a course northward of west should be steered to allow for the inshore set of the current, and to give the Monte Christi Bank a good berth.

When Granja Point bears south (S. 1° E. mag.) a vessel will be to the westward of Granja Bank, and when Tercero Cay, the most northerly of the Seven Islands, and the third counting from the eastward, bears south (S. 1° E. mag.) she will be westward of Monte Christi Shoal.

The Seven Islands form a group ot small low cays lying on a shallow part of the bank to the westward of Granja Point, occupying a space of about 8 miles east and west, and 5 miles north and south. The northern edge of the bank is about 4 miles to the southward of Monte Christi Shoal, and a navigable channel a mile wide appears to exist between the cays and the shore. Tercero Cay bears N. 89° W. (west mag.), 9 miles from Granja Point, and Arenas lies 4 miles farther to the SW. The most of them are covered with mangroves, but Monte Grande, the largest and the second from the eastward, is distinguished by trees larger than those on the others.

Anchorage will be found under the eastern islet, called Monte Chico, and also under the southern one, called Tororu. The latter lies near the edge of the bank.

Currents and Tides.—Near the Seven Islands and northward of them, the current sets to the SE.; therefore during light winds it is necessary to be cautious in approaching them from the NW. or west. The tides are perceptible in the vicinity of the islets and channels; the flood runs to the SW., half a knot an hour, and the ebb NE. at the same rate.

Manzanillo Bay is a secure and accessible anchorage. The shores of the bay are low and covered with mangroves, the eastern shore forming the delta of Yaque River. On the south shore is the mouth of the River Massacre, forming the boundary between the territories of Haiti and Santo Domingo.

There is no danger in Manzanillo Bay; an excellent well-sheltered anchorage will be found east of Manzanillo Point, about ½ mile off shore in 7 fathoms, muddy bottom. The edge of the bank of soundings is very steep, and on the eastern side of the bay is only ¾ mile off shore.

In appoaching the Manzanillo Bay from the eastward, the ba Monte Christi may be crossed with safety.

Foul ground extends for about ¾ mile off Yuna Point; a good should be given it, and to the coast as far south as Manzanillo Po

Water.—The River Tapion empties itself into the east side of zanillo Bay, the Terrabassa into the SE. corner, and the Massacr the south side. Good water will be found in either, but it will be

sary to proceed 6 miles up the latter, in the dry season, before it is fit for drinking.

Directions.—Manzanillo Bay may be approached by the route outside Monte Christi Shoal, and westward of the Seven Islands, or by the channel through Monte Christi Bay. In the former case a vessel from the eastward would go much to leeward and have to work to the anchorage. To take the inner channel after having passed Granja Point, steer to the westward, and when Yuna Point bears S. 12° W. (S. 11° W. mag.) steer towards it until Monte Chico bears N. 89° W. (west mag.), when alter course to S. 46° W. (S. 45° W. mag.). Pass eastward of Tororu, and when it bears N. 23° E. (N. 22° E. mag.) haul to the southward, and work into the anchorage.

In this channel a vessel may anchor for the night; the depths are 6 and 7 fathoms, sandy, mud bottom, and the holding ground good. The edge of the bank is very steep; from the depth of 11 to 18 fathoms it suddenly increases, the seamen should therefore be certain of being on the bank before letting go the anchor. In this bight the trade winds during the day and land winds at night are always sufficiently fresh to facilitate greatly the communication between Fort Dauphin and Monte Christi.

Fort Dauphin Bay.—The harbor is an excellent one, being perfectly sheltered, commodious, and affording excellent holding ground, with a depth of water sufficient for vessels of the largest size. The entrance is so narrow and crooked as to render it difficult for a sailing vessel, except with a commanding breeze. Shoals make off for a short distance from the points in the channel, making the turnings difficult with a long vessel, and great care must be exercised. No directions can be given for the entrance except to keep in mid-channel, for which the eye will be the best guide. This narrow channel widens into a land-locked basin and free from shoals except to the eastward of Fort Dauphin.

Near the middle of the bay is Boyau Islet, which is foul to the distance of 200 yards on its NE. side; the most convenient anchorage will be found in 12 fathoms water, between Fort Dauphin, which is built at the north end of the town, and the islet. There is a good careening spot on the northern shore, a little eastward of the inner end of the channel.

About a mile westward of the entrance to the port commences the great reef, which sweeps outward towards Cape Haiti, and protects the east side of that harbor.

—'des.—It is high water, full and change, in port Fort Dauphin at
m.; springs rise 5½ feet, neaps 3½ feet.

Caracol Bay lies between Yaquezi Point, which is 9 miles westward
port Fort Dauphin, and Caracol Point, and is nearly 4 miles wide, but
s so shallow as to be only fit for coasters, which find their way into it
her by channel within the reef, or through a narrow intricate cut to
NE. of Caracol Point.

Limonade Bay.—Westward of Caracol is a small bay, before which is anchorage for coasters, with a deep cut in a NW. and SE. direction through the reef. Thence the shore still trends westward for 3 miles, and then turns suddenly to the northward along the eastern side of the great promontory of Cape Haiti.

Cape Haiti, formerly called Cape Français and afterwards Cape Henri, is sheltered on the south and west sides by the coast, and to the east and NE. by sand banks and reefs. Although it is open to the northward, the anchorage is well sheltered in that direction by banks and shoals within the harbor, which is easy of access in the daytime. The approaches to the anchorages are not lighted, nor are the buoys on the shoals to be depended upon. The southern shore is low and swampy, and bounded by a sandy beach. At the east end of the beach stands the small village on Petite Anse, and about midway between the village and the western shore there is a small woody hillock, on which is the ruin of a fort. The River Haut du Cap empties itself into the SW. corner of the harbor, but the water is not sufficiently good for drinking until 2 or 3 miles within the entrance. An iron bridge crosses this river.

About 300 yards NW. of Picolet Point, and close to the shore, there is a remarkable small barren reddish colored rock, streaked with yellow, and much washed away at the base, which may be recognized at the distance of about 3 miles, and a fort with white walls stands on the extremity of the point about 50 or 60 feet above the sea. Half a mile to the southward of the point is Fort Joseph, which is overlooked by a hill 963 feet high, detached from the main ridge, and crowned by the lookout house with its roof painted red and white; ¼ mile within Fort Joseph there is another small battery, and ½ mile farther in at the north end of the town are two forts at the waters edge, which command the anchorage.

Town.—The town of Cape Haiti stands on a small plain on the west side of the harbor, at the foot of a high range of mountains called Haut du Cap, which rises abruptly a short distance north of the town. The Masonic temple is the highest building in the town; its eastern gable has a portico and is painted gray. The cathedral, in the center of the town, is a large conspicuous, square building, of a yellow color, with a dark sloping roof. The square tower and some other portions of the old cathedral are still standing. The customhouse is recognized by a house painted red standing next south of it.

The people are neat and cleanly; the streets are dirty.

A wooden pier about ¼ mile long extends southeasterly from customhouse. There is now about 10 feet of water at end of the p The harbor is filling up from the river.

Population about 15,000.

The United States is represented by a consul and vice-consul. A orities to visit: The general commanding the district and the mandant of the place.

Boat Landing is near the captain of the port's house, which is yellow and in the northern part of the town. The Haitien flag flies from this house. Discharging and loading by lighters; they are expeditious and well constructed.

Supplies.—Fresh provisions can be had of fair quality and are moderate in price; fruit is very cheap in season. Water is abundant and fair in quality. It is brought to the town by pipes, and vessels water by boats from the wharf.

Coal can be had in small quantities; cost $13 to $14 per ton, transferred to vessels in barges.

Steamers—Mails.—Several lines of steamers run from Boston and New York. Mails are carried by the steamers, also once a week by horseback to Port au Prince.

NOTE.—Vessels are prohibited from entering or leaving this port, as well as the rest of the ports of the Republic, between the hours of 6 p. m. and 6 a. m.

Tides.—It is high water, full and change, in Cape Haiti Harbor at 6h. 0m.; the rise is about 3 feet.

Port Charges, Pilotage Dues.—Tonnage dues $1 per ton; pilotage on vessels from 50 to 100 tons, $4; 101 to 200 tons, $8; 201 to 300 tons, $10; 301 to 400 tons, $12; above 400 tons $16. Doctor's visit, vessels of 200 tons or less, $8; 201 to 300 tons, $12; 301 tons and over, $16; for each steamer $25. Fountain for vessels from 15 to 50 tons, $2; 51 to 100 tons, $3; 101 to 150 tons, $4.50; 151 tons to 250 tons, $6; 251 tons to 300 tons $7.50; above 300 tons $10. The charges on a vessel of 150 tons are $327.15, calculated as follows: In addition to the regular dues 88½ per cent of the sum of the tonnage and doctor's visit, and 30 per cent of the sum of the pilotage, signaling, and fountain dues are charged.

Signals.—At the "Lookout" there is a small house for a lookout, and there are three masts planted there in about a N. 21° E. (N. 20° E. mag.) S. 21° W. (S. 20° W. mag.) range from each other and well apart. A good lookout is kept at this station constantly, and the following signals are used to communicate the approach of vessels:

A signal on the northern mast indicates a vessel approaching from the eastward.

A signal on the center mast indicates a vessel approaching from the northward.

A signal on the southern mast indicates a vessel approaching from e westward.

A white flag denotes a sailing vessel.

A blue flag denotes a steamer.

A red flag denotes a Haitien steamer.

A blue flag and pennant denote a foreign man-of-war.

A red flag and pennant denote a Haitien man-of-war.

Reefs.—The reefs in the harbor can always be seen when it is smooth

and the sun moderately high; if it is rough the sea breaks continuously on the weather side of all except La Trompeuse.

Le Grand Mouton, the shoal which shelters the anchorage in the harbor from the north and obstructs the passage in, is 800 yards long in a north and south direction and 400 yards broad. Its north end, on which the sea generally breaks, is about ¼ mile from Fort St. Joseph, with a clear deep channel between, but being so far to leeward, although the most direct passage, is seldom used by sailing vessels. At about 200 yards eastward of the south end of Le Grand Mouton there is a small detached shallow head, steep-to.

Le Petit Mouton, which generally shows itself, lies S. 55° E. (56° E. mag.) ¼ mile from Le Grand Mouton buoy, and near the edge of the eastern reefs.

La Trompeuse is a small shoal with 3 feet water on it, lying in an awkward position near the middle of the bay.

Shoal.—There is no buoy to mark the shoal which is located about 800 yards S. 21° W. (S. 20° W. mag.) of the Mardi Gras Shoal. It was the intention to have placed a buoy there, when the other buoys were recently put down, but it has not been done.

On this unmarked shoal lies the wreck of the old English man-of-war Bulldog, wrecked there in 1866, and on which wreck the Clyde steamer Saginaw recently struck and received considerable injury. The wreck is entirely beneath the surface of the water.

A Wreck, with several small spars and a stump of a mast showing above water, lies in 10 fathoms of water about 1,135 yards eastward of Dames Point.

Buoyage.—At eastern side of entrance, marking the western side of the detached 3¼-fathom patch, a black buoy in about 6 fathoms of water on the following bearings:

Fort Vitton (Woody Hillock).....S. 12° W. (S. 11° W. mag.)
Picolet Point.....S. 58° W. (S. 57° W. mag.)

At the northern extremity of Le Grand Mouton a black and white perpendicularly striped buoy, surmounted by a red spindle, moored in about 4½ fathoms water on the following bearings:

Fort Vitton.....S. 11° W. (S. 10° W. mag.)
North side of battery on St. Josephs Point.....S. 77° W. (S. 76° W. mag.)

At the eastern extremity of Mardi Gras Reef a red buoy with white top, on the following bearings:

Fort Vitton.....S. 11° W. (S. 10° W. mag.)
Masonic Hall.....S. 53° W. (S. 52° W. mag.)

The red buoy marking the detached shoal SE. of Le Grand Mou was moved about 100 yards to the northward and eastward and rela about on the line of the 5-fathom curve, on the following bearings:

Picolet Point.....N. 32° W. (N. 33° W. mag.)
Masonic Hall.....S. 59° W. (S. 58° W. ma

La Trompeuse buoy is now a black buoy, and lies about 100 yards NE. of its former position, on the following bearings:

St. Josephs Point.....N. 30° W. (N. 31° W. mag.)
Customhouse .....S. 78° W. (S. 77° W. mag,)

Le Belier buoy is moored on the 5-fathom curve, with the following bearings:

St. Josephs Point.....N. 28° W. (N. 29° W. mag.)
Customhouse .....N. 76° W. (N. 77° W. mag.)

Directions.—In approaching the harbor at Cape Haiti from the eastward, a vessel should steer about S. 68° W. (S. 67° W. mag.) after passing the Monte Christi Shoal, till the highest part of the mountains of Haut du Cap bear about S. 46° W. (S. 45° W. mag.). Then steer for them till the fort on Point Picolet is sighted. This fort should be brought to bear S. 24° W. (S. 23° W. mag.) and approached on this bearing. A pilot can generally be obtained off this point, and a stranger should take one. They should, however, be carefully watched and not implicitly trusted. In standing in, S. 24° W. (S. 23° W. mag.) for Point Picolet, by keeping the masts of the lookout station a little open to the right of Fort Picolet the detached bank of 19 feet on the east side of the entrance is avoided; then as soon as Cape Haiti, the northern point of the promontory, bears N. 89° W. (west mag.) a vessel will be abreast of the NW. point of the reef called the Coq Vieille, and may then haul to the southward.

In approaching Cape Haiti Harbor from the westward, a vessel should keep at least 1½ or 2 miles off shore to avoid the coral reefs skirting the shore.

Approaching Grand Mouton be careful not to shut in the barren rock which lies NW. of Picolet Point, with that point, until the vessel is abreast of the north end of the bank, or the Lookout comes in one with Fort Joseph bearing N. 89° W. (west mag.), when keep away with the buoy off the SE. end of the Mouton on the starboard bow.

Having passed eastward of this buoy, steer towards the customhouse, with that building in line with the Masonic Hall, and when Point Picolet bears N. 10° W. (N. 11° W. mag.), haul up for the anchorage, passing inshore of La Trompeuse Shoal. As a vessel may have to haul up as high as SE., she must wait until the sea breeze has set well in, and strangers had better not attempt to enter without a pilot, who is generally at hand. A sailing vessel will have to wait for the land wind to carry her out; and as the sea breeze in the winter months sometimes prevails during the night, she may be liable to some detention.

The clearing marks formerly used are not now readily recognized by a stranger. The following will be useful:

When entering this harbor Barren Rock should be kept just open of Picolet Point until the cathedral bears S. 66° W. (S. 65° W. mag.), when it must be steered for on that bearing. When Picolet Point bears

N. 10° W. (N. 11° W. mag.), La Trompeuse Shoal will have been passed, and anchorage may be taken up as convenient.

The pillars of the ruined gateway between Forts St. Joseph and Picolet, open off Fort St. Joseph, leads to the eastward of the shoal stretching off shore in the western channel.

Winds.—Steamers may enter and leave this port at any time when the leading marks can be seen, but sailing vessels must enter with the sea breeze and leave with the land breeze, which blows during the evening and night from ESE. to SE. and dies away about 10 o'clock a. m. After an interval of calm the sea breeze springs up about 11 o'clock a. m., blowing from NE. to ENE.

Throughout the 24 hours the winds off shore blow from the eastward, except when interrupted during the winter for a short time by north and NW. winds. The former causes much sea in the harbor and outside, and lessens or overpowers the land breeze, so that until the sea goes down and a steady land wind blows at night a sailing vessel's departure had better be delayed.

Currents.—After north or NW. winds have been blowing for some days the current sets strongly to the eastward along this part of the coast.

Port Français, 5 miles westward of Picolet Point, is a small bay open to the northward; there is, however, excellent anchorage, with the prevailing winds, in the SE. part of the bay.

Port St. Honoré, the eastern point of the bay, is skirted by a reef to the northward. To enter the bay, haul round this reef, leaving on the starboard hand two other small reefs nearly awash, off those reefs which skirt Baro Point; then standing about ¼ mile to the southward, anchor in from 8 to 10 fathoms, with the fort bearing S. 66° E. (S. 67° E. mag.).

The point on which the fort is situated projects so as to divide the bay into two smaller ones, of which the northern affords the best anchorage. In the middle of the southern one there is a small reef, and its shores also are foul.

From St. Honoré Point the shore recedes to the southward and westward, forming a deep bight, as far as Marigot Point, 9 miles westward. The front is skirted by an impassable mass of reefs and cays, upon a White Ground, which commences at the south end of Port Français, and takes a westerly direction for 5 miles to Philippot, the largest of the cays, when it becomes broken, and leaves small openings leading into Acul Bay.

Acul Bay is a well-sheltered inlet, 4 miles in length north and so. and about ½ mile in breadth. It has sufficient depth for vessels of largest draft, and its shores are in some parts so bold as to af safe places for careening. The entrance channels, however, thro the reef are so narrow that they are not easily accessible to large sail vessels, and if the islets and shoals are not clearly visible, they sh

not be attempted. It is difficult to make out the entrance from the offing, there being no buildings or conspicuous objects to mark it.

There are three channels by which a vessel can enter. The eastern, between Arena Cay on the east, at the extremity of the reefs bordering the coast from Port Français, and Rat Islet on the west, is only 200 yards wide. The former cay, small, low, and sandy, lies about 1½ miles to the NE. of the entrance of the bay, and the same distance to the eastward of Philippot Cay. Rat Island is small, low, wooded, and lies about a mile to the WSW. of Arena Cay, and little more than ¼ mile from the SE. end of Philippot Cay.

Water is difficult to obtain in Acul Bay; the best place is at a small stream SE. of Marias Point.

Directions.—Approaching the eastern channel, be careful to keep an offing of at least 3 miles, until Rat Islet bears S. 18° W. (S. 17° W. mag.), and at this distance Marias Point, the east side of the entrance, will be easily recognized, and on nearing it a low point within on the west side, in the interior of the bay, named Bélie Point, on which there is a remarkable clump of trees. These two points in one, with slight deviation so as to preserve the depth of 9 or 10 fathoms, will lead nearly in mid-channel; on either side there are white sand banks, with 4 fathoms on their edge. It is necessary that the leading marks should be clearly made out when well outside. After passing Rat Islet the channel opens out, all the dangers are visible, and there is good temporary anchorage in 13 to 16 fathoms water, outside the entrance to the harbor.

If intending to enter the inlet, give Marias Point a berth of at least 600 yards, to avoid a bank, on which there is very little water, and having near its west end a small islet named Bayou. Thence shape the course in mid-channel, taking care to avoid the patch with 2½ fathoms water on it, S. 10° E. (S. 11° E. mag.), ½ mile from Marias Point. Having passed this, the vessel will be within the outer basin, and may anchor under the eastern shore in 9 fathoms. To enter the inner basin, she must haul up, and pass Moro Roxo (Red Hill) Point at the distance of 100 yards to clear a shoal which extends off from Bélie Point, and having rounded that bluff, haul into the small cove called Lombardo or Carénage, and anchor in 6½ fathoms water 200 yards from the shore. The inner end of the inlet is so studded with shoals that it would not be prudent to advance farther in without the assistance of a pilot.

Middle Channel.—To take this passage it is necessary that the wind should be well to the northward, as the vessel will have to lie up SE., and there is no room to work. Keep without the White Ground until Rat Islet bears S. 13° E. (S. 14° E. mag.). Haul in on this course, which will lead to the eastward of the reef which runs off from Philippot Cay, and about 200 yards to the SW. of some reefs easily seen, which lie about 1½ miles to the northward of Rat Islet, then haul up to the E. in order to weather the reef which extends off to the eastward of this islet, and having passed it shape the course for the outer anchor-

age or entrance to the harbor. The only advantage in this channel is that all the reefs are seen, but be prepared to anchor in a moment should the wind die away within the reefs. The ground is hard mud, good for holding and sheltered from the sea breeze.

Limbé or Western Channel takes its name from a small round islet close to the east side of Limbé Point, which forms the west side of the entrance, the east side being bounded by Veille Cay. This is the largest and best channel, as there is room to work in it. When approaching this channel it is also necessary to keep well outside the bank until Yeague Point bears S. 1° W. (south mag.). This point is between that of Limbé and Gran Boucaud, which is the western side of the entrance. That of Limbé is the northern and western, and the islet is near it. Then haul up S. 27° E. (S. 28° E. mag.), or towards Yeague Point, which being a steep, bold, rocky bluff, and the only elevated spot to the SE. of the Mount Marigot, may be readily distinguished.

As Yeague Point is approached, the sea will be seen breaking on a large reef to the eastward, on which is Veille Cay, with 4½ fathoms water near it. Then steer midway between it and the point in from 9 to 14 fathoms water, so as to pass 600 yards from Gran Boucaud Point, and anchor westward of Marias Point. If necessary to work in, the reefs on which the sea breaks may be approached to a prudent distance, and the coast to 400 yards. There are other reefs to the SW. of Rat Islet having narrow channels between them.

Limbé Islet.—The small islet of Limbé lies eastward of the point of the same name. To the southward of it there is anchorage sheltered on the north by the islet and by the reef called the Peña Pobre, which extends eastward from Limbé Point. But this anchorage in front of the town of Limbé is open to the eastward, and only fit for coasters which moor between the coast reef and that surrounding the island in about one fathom water.

Caution.—As the various charts of this locality differ, these instructions must be used with caution.

The coast line to westward of Cape Haiti from Limbé Point to Cape Rouge appears to be from 2½ to 3 miles farther to the northward than is indicated on the charts.

Marigot Point is next westward of Mount Marigot, and off it is a small round islet which becomes a useful object in this neighborhood.

Chouchou Bay is about 3 miles westward of Marigot Point. In this bay there is a good anchorage in 5½ or 6½ fathoms water. Entering the bay, round the eastern point close-to, in 5 fathoms, and shoot the ves into a berth, for she will lose the wind within it even should it b hard outside. A short distance westward, and separated from it Baril du Bœuf Point, is the small bay of Salt River, in which ther shelter for coasters.

Fond la Grange is the name of a bay, about ½ mile wide and the s deep, lying 4 miles westward of Chouchou. Palmiste, its western p

is known by a chain of dangerous reefs which extend westward 1½ miles from the shore, almost as far as Cape Rouge. There is good anchorage here, and shelter for vessels of the largest draft. The shore is steep, and nearly 400 yards off it the depth is 5½ fathoms. The east point is bold and steep-to, and having rounded it, anchor as most convenient in the middle of the bay in 6½ fathoms water, muddy sand.

Immediately westward of Fond la Grange is a bay and the mouth of the Borgne, which affords anchorage for small vessels in 2 to 4½ fathoms water under shelter of Palmiste Point, but open to the north.

The Coast from Chouchou takes a NW. by W. direction for about 18 miles, where it terminates at Carenero Point, the north extreme of this part of the island, and the east point of Port Paix, and is very apt to be taken for Cape Rouge which is 8 miles from it. From the small bay of Borgne to Cape Rouge, about 3 miles westward, the coast is formed of cliffs, and bordered by reefs which are covered and extend off 1½ miles. Between is the little bay of Lavaud, fit for small vessels, and a river runs into it.

Anchorage.—Between Grand Point and Icague Point are the following anchorages, only fit for small coasters: The bay and river of Cape Rouge, with 1¼ to 2¾ fathoms of water, well sheltered by the reefs; the bays of Great and Little Marigot, with 2¼ to 3¼ fathoms, and the bay of Petit Rivière. These last anchorages are somewhat sheltered to the northward by Tortuga Island, but hardly at all to the eastward.

From Cape Rouge to within ¼ mile of Icague Point are a chain of reefs, with a narrow channel between the reefs and the shore having a depth of 1¼ to 2¼ fathoms of water. Through this reef are several cuts, but there appears to be none between the eastern end of the reef and Point Icague. Icague Bay and the River Bas de Saint Anne may be reached through the first cut to the westward (of Icague Point), where there is anchorage for small vessels in 2¼ fathoms of water; bottom, sand and weeds.

Port Paix is merely a small bay, not more than ½ mile wide and scarcely ¼ mile deep; it affords, however, well sheltered anchorage, being protected on the north by Tortuga Island, and is only open from NW. to west. The town stands on the eastern shore, and is commanded by two small forts. The land behind is lofty, with a small, but remarkable, sugar-loaf hummock, sloping to the westward. From Pèrez Point, on which stands the battery to the north of the village, the shore is skirted by a reef, said by French and Spanish authorities to the distance of 600 yards, with 12 fathoms on its edge. But this would nearly ck the bay up; by the plan it runs off only about 200 yards. Enter- ; Port Paix (which should be done under easy sail), bring the village bear S. 44° E. (S. 45° E. mag.), and keep in mid-channel between forts, anchoring directly the depth is less than 20 fathoms; this will just within the line of the forts, at about 400 yards from the village. e holding ground is excellent, and the vessel will shoot into about 12

fathoms, mud and sand. Small vessels, anchoring further in, must be careful to avoid a small rock which lies about 100 yards from the shore, in front of the town.

The German line of steamers call here, also the Diamond line from Boston.

The United States is represented by a consular agent.

Tortuga Island.—This island is 22 miles long and 6 miles broad; the center is moderately elevated, but its extremes are low. The north side is formed of perpendicular inaccessible cliffs, steep-to; the greater part of the southern shore is skirted by shallow white grounds and reefs, which within them in some places afford shelter to coasters.

Tierra Baja Road, the only good anchorage the island affords, is situated on the south coast, 4½ miles from Point Portugal, the SE. point of the island. It is surrounded and sheltered by reefs stretching out from the coast, and is only fit for vessels drawing 14 or 16 feet of water, as the bottom is irregular, and the soundings vary from 3 to 6 fathoms.

To enter the anchorage, the village should be brought to bear N. 38° W. (N. 39° W. mag.), and should be approached on this course, which will lead between the reefs, which break and are easily distinguished by the eye. A good berth will be found in 6 fathoms of water, with sandy bottom, and with the village on the above bearing. At the entrance of this channel, called the eastern passage, there is a bank with only 3¼ fathoms in mid-channel. The western passage has only 9 feet of water. Large vessels may anchor outside of the reefs, on the white ground, about one mile to leeward of the town.

Between Tierra Baja Anchorage and Portugal Point there are several small coves, affording temporary anchorage to small coasters.

There is also said to be anchorage under the west end of the island.

The tide rises about 3 feet.

Tortuga Channel.—The channel between the island of Tortuga and Haiti is 4 miles wide in its narrowest part, and, as there is an easterly current generally setting through, it may be advantageously used by vessels bound to the eastward. In the daytime it is perfectly safe to beat through, as the reef can be seen, but it should not be attempted at night.

Currents.—There is an easterly set through this channel during a greater part of the year. On both sides of the channel however, a contrary eddy may generally be found one mile off shore. They should not, therefore, be approached within that distance. A westerly current is only found here when southerly winds have been blowing for s days, which is rarely the case. If, however, a westerly current is perienced, vessels bound to the eastward should, instead of ente the channel, stand 15 or 20 miles to the northward. Winds are m variable in the channel than outside.

Moustique Bay lies WSW. 10 miles from Port Paix, and the l between is bold, scarped, and steep-to. It is about 800 yards acros

its entrance, and about the same deep, the bottom irregular and rocky, and between the points at the entrance there are 28 fathoms water. On the west side of the bay there is a small islet, and about 150 yards to the SE. of the islet there is a rock under water. The best anchorage will be found nearly abreast this rock, in the middle of the bay, in about 20 fathoms, but be certain of soundings before anchoring.

Port à l'Ecu is 4½ miles westward of Moustique Bay, and the shore between is lofty and very steep. This is a better anchorage than Moustique, but the entrance is much narrower on account of a reef which skirts the east side and extends 300 yards from the point, with 7 fathoms on its edge and 2 fathoms within. This port is sheltered from north round by east to NW., and it is difficult to enter with the usual winds unless they are well to the northward. Entering Port à l'Ecu, it will be necessary to give the above point a wide berth and then haul into the bay, and anchor with a remarkable house on the southern shore bearing S. 24° W. (S. 23° W. mag.) in 7½ fathoms water, sandy bottom. On the west side the bottom is mud, good holding-ground.

Tides.—It is high water, full and change, in Port à l'Ecu at 6h. 0m.; springs rise 3 feet.

Juan Rabel Bay, about 8 miles westward of Port à l'Ecu, affords anchorage, and is easy of access. Juan Rabel Point is low and bushy and stands prominently out to the northward; the shore in the neighborhood is diversified by bold rocky cliffs and sandy beaches, and the interior becomes mountainous, and broken into distinct ridges. A remarkable peak, resembling the ruins of a castle, bears S. 52° W. (S. 51° W. mag.) from the bay, about 2 miles inland. About a mile southward of Juan Rabel Point there is a small village, and near it a river; and to the left of the village, a high white cliff and long sandy beach. The east side is skirted by a reef, steep-to, and may be approached without fear; the depth is 8 fathoms close to the edge. Vessels of large draft had better anchor NNW. of the village, distant ½ mile, and about 400 yards from the reef, in from 10 to 13 fathoms water. It will be better not to shut in the two points on the east side, as within that line the soundings decrease suddenly and the bottom becomes foul.

The Coast from Juan Rabel Point trends to the WSW. for 12 miles to Cape St. Nicholas Mole, and is composed of low rocky cliffs, steep-to It affords no shelter, and has received the name of the Iron Coast.

The Current in the offing, about 6 miles from the shore, at times takes a NE. direction, but the set is in general westerly, and within that distance it inclines toward the land, increasing in strength. In proportion the channel between Cuba and Haiti is approached it also increases strength, inclining to the SW.

St. Nicolas Mole.—Its northern side is formed by a low, flat peninsula, joined to the mainland by a narrow isthmus. From the flat surface this peninsula the bay has received the name of St. Nicolas Mole. the outer part of the bay the water is so deep and the shore so bold

that there is no safe anchorage. When seen from the offing the mountains back of the town of Le Mole present a burnt, brownish appearence. A conspicuous church stands a little to the southward of Fort St. George.

The bay is close and confined, however, and in the rainy season would probably be an unhealthy place.

The population is about 600.

The port is tolerably healthy and cool. There is no quarantine and no health officer.

Salutes can be returned from Fort St. George.

There are no pilots, and there is no necessity for taking them.

The authority to visit is the general in command.

Water may be obtained at night from a brook used by washerwomen in the daytime, and emptying into the bay east of Fort St. George.

No dependence can be placed upon procuring fresh provisions here.

Telegraph.—There is a telegraph cable to Port au Prince.

Shoal.—A shoal with 4 fathoms on the outer edge and decreasing to the shore extends about 300 yards to the westward from the SW. end of Fort St. George.

Directions.—A vessel will have to work into St. Nicolas Bay, but although the shores are steep-to, it will be advisable not to approach the south side too closely, as the sea breeze generally blows strong from NE. in variable gusts, and she might miss stays. The most convenient anchorage will be found in from 7 to 10 fathoms water, at about 400 yards from the northern shore with Fort St. George, which stands in front of the town, bearing S. 21° E. (S. 22° E. mag.), and the magazine to the NE. of the town S. 83° E. (S. 84° E. mag.). The soundings are extremely irregular and foul, and a vessel will not be on the bank until Fort St. George bears S. 55° E. (S. 56° E. mag.); a conspicuous church stands a little southward of Fort St. George.

Wishing to proceed farther in, do so without fear, but keep the town shore aboard, and a good berth will be found with Fort St. George bearing S. 55° W. (S. 54° W. mag.), and a guardhouse close to the east side of the town S. 10° W. (S. 9° W. mag.). If intending to enter the carénage, it will be better to wait until the sea breeze lulls, and then warp or tow in; in the winter this will not take place until toward 8 p. m. The land wind generally comes off from SE., and blows moderately until about 6 a. m., when there is a calm for about two hours before the trade wind sets in. If bound out to the northward and eastward, it will be better to weigh with the last of the sea breeze.

Cape Fou bears S. 46° W. (S. 45° W. mag.) 4½ miles from Cape Nicolas, and near its extremity lies a small rock resembling an i
A short distance to the southward there is also a remarkable
cliff, called the Upper White Horses. Between Cape Fou and
Point the features of the shore are bold, perpendicular cliffs stee
The interior rises abruptly into a ridge of mountains 2,000 feet

only 3 miles from the shore, under which vessels are frequently delayed by calms. The current sets strong round the point to the northward, but 6 miles in the offing it will generally be found running to the west and WSW.

From Pearl Point the shore sweeps round to the SE. for 10 miles, and terminates at a remarkable white rocky bluff with a flat mound on its summit, called the Platform; about 3 miles NW. of it there is another similar cliff called the Lower White Horses.

Vessels finding the northerly winds too strong on opening Pearl Point, should seek shelter under the Platform, either anchoring or remaining under way.

Anchorage will be found in 8½ fathoms water close to the shore westward of Pearl Point, in a sandy bay, where there is a small village, with the entrance to a small rivulet bearing N. 24° E. (N. 23° E. mag.), and the southernmost point S. 78° E. (S. 79° E. mag.). The bank does not extend more than 400 yards from the shore, and is so steep that the first cast will be 10 fathoms; but a vessel had better shoot into the depth above, as the edge is foul. In the rainy season it is a good watering place. To the westward of the Platform is the little bay and village of the same name, where there is anchorage in 2½ to 3¾ fathoms water; a rivulet runs into the middle of the bay.

Henne Bay.—From the Platform the shore takes an easterly direction for 7 miles to a remarkable white cliff at the base of the high land; thence it trends NE. by E. for 2 miles to Henne Bay, on the west side of which a lofty mountain rises from the shore to the height of 1,700 feet. It is not a good anchorage, but if obliged to anchor here, the best place will be found on the eastern side of the bay where the soundings are least irregular, in about 15 fathoms of water.

From Henne Bay the coast runs SE. by E. nearly 2 miles, and then E. ½ S. for 3½ miles to Paradise Point, on the east of which there is a small bay open to the SE.

Port Piment.—The shore from Paradise Point takes a slight curve inwards until near a remarkable mound on the low savanna land, at the back of the small bay called Port Piment. There is also anchorage here in a case of necessity, and the shore is bold and steep-to all the way from the Platform.

Corridon Point.—From Port Piment the shore trends SE. by E. for 7 miles, to a prominent bluff rocky point called Corridon, whence to Pierre Head its direction is SE. ½ E. and the distance 10 miles.

nchorage.—There is an extensive bank of soundings off the bend the coast between these two points, on which a vessel may anchor 17 fathoms water, clean ground, with Corridon Point bearing N. W. (N. 42° W. mag.) and Pierre Head S. 88° E. (east mag.).

ierre Head is a lofty rocky headland, overlooked by a mountain of same name. At ¼ mile S. 33° W. (S. 31° W. mag.) of it, there is a k with a depth of 2 fathoms; and nearly a mile S. 10° W. (S. 8° W.

mag.) of the point there is another with 3¼ fathoms on it. They are of small extent, and between them the soundings are 14 and 15 fathoms. A grove of trees, called Bayahondes, standing eastward of the town of Gonaïves, in one with Point Blanca de Gonaïves, bearing S. 88° E. (east mag.) will lead between them; and when Pierre Head bears N. 2° E. (north mag.) steer S. 66° E. (S. 68° E. mag.) to round the reefs which extend 300 yards from Point Verde de Gonaïves, the north point of the bay.

Winds.—On the west coast of Haiti the sea breeze, in settled weather, generally sets in from the westward at about 11 a. m. and continues until 7 p. m. The land wind comes off from SE., and in the rainy season it frequently rushes down from the high lands with the violence of a tornado, with little or no warning, and everything must be in readiness to shorten all sail in an instant. These gusts generally extend to the distance of 6 or 9 miles from the shore; sometimes, however, in the hurricane months they will reach the middle of the channel between Haiti, Cuba, and Jamaica.

Gonaïves Bay, although open to the westward, is a safe and good anchorage, especially for vessels of light draft, which can proceed into Hospital Bay, where they will lie landlocked in 3½ fathoms water. The entrance between Verreur Point on the south and the nearest part of the northern shore is nearly a mile across, and the only danger of importance is a shallow ledge, which extends northward about 400 yards from Verreur Point, and which can be avoided by the eye in clear weather.

Verreur Point is low and covered with bushes which extend to the water's edge; it is the north end of a small low peninsula (or rather island, for it is separated from the main by a channel for canoes at high water) which forms the west side of the inner harbor. The entrance is difficult to be made out from the offing, especially at the first time of approaching it. The bank which lines the north and east shores of the bay of Gonaïves obstructs the entrance of Hospital Bay with several coral heads nearly awash, narrowing it from an apparent width of one mile to 700 yards.

Gonaïves is near the shore on the east side of the bay. The landing is abreast the middle of the town and just north of a small battery. South of the town are large salt-works, extending as far as Mangles (Ligro) Point, bounding, to the eastward, Hospital Bay, the western limit of which is Verreur Point. Population, about 8,000.

The United States is represented by a consular agent.

Port Charges.—Pilotage, $5 in and out; health visit, $6; to... dues, $1 per ton for vessels whose nations have a reciprocity tre... interpreter's fees, $4.

Directions.—Entering Gonaïves Bay with the sea breeze, a ... may pass either to the northward or southward of the shoals off P... Head.

The soundings are very regular, decreasing gradually as the shore is approached, and the anchorage may be chosen according to the vessel's draft. The best berth for vessels of large draft will be found in 7 fathoms water, mud, sand, coral, and weeds, with Fort Castries bearing N. 2° E. (north mag.) and the center of the town N. 80° E. (N. 78° E. mag.). Small vessels may go so far in as to bring the fort N. 21° W. (N. 23° W. mag.).

After passing Point Verde de Gonaïves, which is low and should not be approached too close, as a shoal extends 300 yards off it, Castries Fort will be seen and the land begins to rise and form into cliffs with several white marks, which will assist in knowing Point Blanca.

A vessel working into Gonaïves Bay should not stand farther to the southward than to keep the rocky shoulder of Mount Biénac on with the northern slope of Mount Chatenay N. 50° E. (N. 48° E. mag.). In leaving the bay keep the above mark on until St. Mark Point opens out 2 or 3 degrees westward of Devil Point, in order to avoid the reef which skirts the shore nearly as far as the latter point; Devil Table from this position will appear as an island. The bay is generally entered with the sea breeze, but in leaving it is better to wait for the land wind.

The sea breeze sets in from the NW. towards noon, and continues until 10 p. m., when it is succeeded by the land wind, which blows off about E. by S. until 6 a. m. At Artibonde the land wind lasts until 8 a. m.

Tides.—It is high water, full and change, in Gonaïves Bay at 8h. 0m., and the rise is about a foot.

The Coast from Verreur Point takes a southerly direction, and continues very low to within a mile of Devil Point, when it becomes a little elevated and forms a flat wooded table-land called the Devil Table. The extremity is a steep rocky cliff, about 50 feet high. The sand bank with from ½ to 2 fathoms water on it, which projects 400 yards northward from Verreur Point, skirts the western shore of the peninsula or island, at the distance of ½ mile, and thence southward as far as Halle Point, the south extreme of Tortue Bay, where it extends off more than a mile.

At 1½ miles N. 10° W. (N. 12° W. mag.) of Halle Point there are two or three dangerous heads of coral, with 1¾ to 2¾ fathoms water on them; these heads are off Tortue Bay on the edge of the bank, and near them are 10 and 12 fathoms water; west of the point also shoal water extends for 1½ miles; the shore therefore as far south as Devil Point should be proached with caution. In case of necessity, temporary anchorage n be had in 3 or 3¾ fathoms water, near the shore in Grand Pierre y.

Artibonde River.—At the bottom of the little bay north of the cliff Devil Point is the River Artibonde, the entrance to which is nearly at low water; at high tide boats may proceed 5 or 6 miles up and ain a good supply of water, but there is no wood at hand. Off Devil

Point, the water is discolored for a distance of about 2 miles seaward of the entrance to Artibonde River. During the rainy season a small steamer, drawing 4 feet water, plies on Artibonde River for logwood.

Anchorage.—To anchor off Artibonde River bring Devil Point to bear S. 2° W. (south mag.), distant about 3 miles, when a few houses will be seen close to the shore. These houses should be brought to bear S. 66° E. (S. 68° E. mag.) and should be approached on that bearing within 2 miles, when a detached bank will be struck, with a depth of water from 6 to 20 fathoms. The lead must be kept carefully going, as within the bank there is no bottom till within ½ mile of the shore, when suddenly a depth of 5 fathoms will be found. A vessel anchoring here must be ready to come to at a moment's notice.

Mark.—On the south side of the entrance to the river there is a remarkable small cavern.

St. Mark Bay.—From Devil Point the shore takes a SE. direction for about 7 miles, and then turns somewhat suddenly to the SW. for the same distance to St. Mark Point, forming the bay of that name, at the head of which is the town (containing 5,000 inhabitants) and anchorage. St. Mark Point is a broad round headland, about 3 miles wide; a shoal extends about 200 yards from it. At 4 miles to the NW. of the town there is a remarkable chalky cliff. The south shore is generally steep-to, with a depth of 13 to 19 fathoms ¼ mile off, but in pla ces is foul; the north shore is, however, skirted by a reef at nearly that distance from Devil Point, as far as the River Guespes. From the shore the land rises to a considerable elevation, and the locality of the bay is pointed out from the offing by the remarkable mountain called Mount Diable, which, about 25 miles eastward of the town, rises to the height of 5,100 feet. Temporary anchorage will be found off either the north or south end of the town, in about 18 fathoms water, at about 400 yards from the shore.

Morne à Vigie, situated eastward of the town, is a conspicuous flat-topped hill, when bearing east (N. 88° E. mag.) leads to the anchorage.

Anchorage.—The usual anchorage is in 15 fathoms, 300 or 400 yards from the shore and north of the cemetery, which is whitewashed. Vessels loading logwood and coffee moor with hawsers secured to anchors buried on the beach and remain in security at this anchorage at all seasons. An old fort stands on the Morne des Guespes, a hill on the north side of the bay.

This port is considered one of the healthiest on the island. There is generally a land breeze from 9 p. m. to 10 a. m., when the sea bre sets in.

The same steamers call here as at Port au Prince.

The United States is represented by a commercial agent and v commercial agent.

Port Charges.—Pilotage, $15; bill of health, $2.50; landing ball $1 per ton; tonnage dues, $1.46 per ton, with reciprocity treaty; wi out treaty, $1.50 per ton; clearance, $2.

Coast.—From St. Mark Point, the low and bushy coast, forming a curve about a mile deep, trends in a SE. direction 8 miles to Montrou Point; thence for 18 miles farther to the village of Arcahais. It is steep-to as far as the bank NE. of the Arcadins, and there is deep water 200 yards from the beach. The land at the back is mountainous and luxuriant with vegetation.

The Arcadins are three small bushy islets about 30 feet high, extending over the space of about a mile, the nearest and smallest being about 3½ miles from the shore. On the east they are bold and steep-to, but the soundings are variable; near them the bottom is hard, but as the shore is approached it becomes soft and muddy. A coral bank extends NNW. about 200 yards from the smallest islet, and a shoal of 3 fathoms lies 1,200 yards N. 66° W. (N. 68° W. mag.) from the southern one. At the distance of 2½ miles S. 88° E. (east mag.) of the southern islet, and about 2 miles from the coast, there is a shallow bank of 1½ fathoms, with shoal water extending 2 miles southeastward of it.

The best anchorage will be found in 11 or 12 fathoms water, with the smallest islet bearing about S. 47° W. (S. 45° W. mag.) distant about a mile. Vessels bound to Port au Prince would find this a good place to anchor for the night, if near it at sunset, with a land wind. Coasters find shelter in 5 fathoms of water from north and northwesterly winds.

Light.—On the NW. extreme of the center Arcadins is a circular white lighthouse, from which, at an elevation of 36 feet above the sea, a fixed white light is exhibited, visible 9 miles, obscured by trees between north (N. 2° W. mag.) and N. 11° E. (N. 9° E. mag.).

Arcahais.—Off the village there is anchorage in 15 fathoms at ½ mile from shore, with the village bearing N. 54° W. (N. 56° W. mag.). At 5 miles to the SE. of Arcahais is the village of Boucassin; south of it, at ¼ mile from the beach, there are 8 fathoms water. There is a small islet called Carnero or Sheep Cay, lying ESE. of Boucassin, but so close to the shore as not to be easily recognized; it is bold and wooded, but there is no passage between it and the land.

Foso Road.—Four miles southward of Carnero Islet is the road of Foso, in which there is good anchorage near the shore, in 18 to 6½ fathoms water, mud. From the shore commences an extensive low plain, inclosed by lofty mountains called the Cul de Sac, which extends from the Grande River as far to the southward as the city of Port au Prince.

Gonave Island lies immediately abreast of the deep bight called the ulf of Port au Prince, and forms two channels leading toward the ty of that name. At a distance, from a NW. direction, two round hills e seen. The highest, called The Table, is in the SE. part of the island. The west coast is low and steep-to, there being 15 to 18 fathoms of ater 200 yards offshore.

Gonave Bank.—Gonave is nearly connected to Haiti by a bank of regular soundings, varying from 2 to 10 fathoms, coral, sand, and id. This bank is steep-to on its western and southern sides, and it tends about 5 miles to the NE. of Little Gonave Island, deepening

quickly to the northward of the line of soundings joining it to the Arcadins. The northern side of the island forms with the opposite shore the channel of St. Mark, which, at its narrowest part, between Galet and Montrou Points, is 8 miles wide; and it is about the same distance across to the Arcadins.

North and NE. Coasts.—The north coast of Gonave, from Mangles Point, the north extreme of the island, to Gros Islet, is foul to the distance of 200 yards, where the depth is from 3 to 5 fathoms; from the latter to Mare Islet, the reef extends out from ½ to ¾ mile, leaving between it and the shore an anchorage for droghers. From Mare Islet to Galet Point, the NE. extreme of the island, the shore is clear; but from this point, which is low, to within 2 miles of Bluff Point, it is skirted to the distance of more than a mile by a broken reef.

Anchorage.—Within the reef there is a depth of 4 and 5 fathoms, white sandy bottom, and several openings fit for vessels of 9 or 10 feet draft. The best of these openings will be found in front of the fishermen's huts, and the best anchorages off the bays Galet, Trou (or Cove), Constantin, and Piron, just within the edge of the reef, and about 80 fathoms from the shore.

SE. Coast.—At the east end of Gonave Island, Grand Bay is between Bluff and Fantasque points; the latter, which is the SE. extreme of Gonave, is a very conspicuous white bluff cliff, and the land forms a small peninsula 2 miles in extent north and south and about one mile east and west.

About a mile to the eastward of the bluff is Little Gonave, which is foul on its north side to the distance of ½ mile. To the eastward of the islet there are several large rocky patches, extending about 2 miles, with from one to 3 fathoms water on them; on the southwestern shoal are two small cays, called Sable and Frégate le Croissant. There is a channel carrying about 3 fathoms water between the cays and Little Gonave, and also between the latter and Fantasque Point; but the current is so strong and variable that it would be dangerous to attempt either without a leading wind.

Anchorage.—Small vessels will find an anchorage under the west end of Little Gonave, and it had better be entered from the southward. The only spot where vessels of large draft can anchor safely is in Park Bay, westward of Fantasque Point; its entrance, however, is so beset with dangerous rocky shoals, not easily seen, that it requires the assistance of a pilot.

SW. Coast.—From Park Bay to the westward the coast is gene.. skirted by detached reefs and is dangerous. Small vessels, howe with the help of the pilot, will find their way through to anchorag the bay of Mahotière or that of Baleines. Here there are from 15 t fathoms on the edge of the reefs, which extend from ¾ to 1¾ miles f the shore. A remarkable white spot may be observed at abo miles from the west end of the island.

Water.—Good water may be obtained at about 5 miles eastward of the NW. point of the island.

Port au Prince, situated at the head of the bay of the same name, is the capital of Haiti. It lies on the northern slope of a spur of the great mountain chain that runs through the island from east to west. Its population is about 35,000 and it is a place of considerable commercial importance. It is regularly laid out, but most of the houses are of wood and the streets are unpaved. The town is nearly surrounded by marshes and is very unclean and unhealthy, especially during the summer months. Behind the city is Fort Alexander, on elevated ground; 2 miles to the westward is Fort Bizothon, a low square building close to the shore. In the northern part of the harbor there is a small but well-sheltered basin, called the inner harbor, large enough to hold a few vessels moored head and stern and having a depth of 4 fathoms. On the northern side of this basin is a small cay called Fort Islet, on which is a water battery.

There are other fortifications along shore, all more or less in ruins.

The market is fair, fresh provisions being moderate in quality and price. Ship's stores are scarce and high-priced.

Yellow fever generally becomes epidemic during the summer months from April to August. There is a medical jury or board of health.

There is no regular quarantine regulations, though the doctor of the port exercises a general supervision over vessels arriving at the port. The thermometer ranges from 75° to 91°. There are two French charity hospitals, which are conducted by the Sisters of Mercy.

The customs duties are very high.

Police duty is performed by the soldiers of the army.

Fort St. Blair is used as a saluting battery.

The authorities to visit are the President of the Republic and the United States minister resident, who is also consul-general.

Water.—Supply is abundant, being carried to the town by pipes from springs in the mountains. Ships can send boats to the wharf at the customhouse.

Coal.—A supply of about 2,400 tons of coal is kept in store. Vessels are coaled by means of lighters, containing 15 tons each, at the rate of about 100 tons per day; the price is about $13 per ton. The lighters are only filled to order, on account of the occasionally rough seas.

Steamers.—Marquis de Campo line, Royal Mail line, Atlas line, French line, and Imperial German Mail line. There are four wharves re where vessels drawing 12 to 15 feet can load and discharge. No oys can be relied upon.

Mail.—In the time of peace there are regular mails to the principal aces on the island.

Pilots can be had, but there is no necessity for them. There are no vernment regulations for them.

Port Charges.—Pilotage dues, 6 cents per ton; anchorage dues, 6 cents per ton; stage hire, $2 per day; wharf dues, $1 per ton; interpreter's fees, $4; water, $1 per cask; tonnage dues, vessels belonging to a nation having no treaty, $1.50 per ton.

Lights.—A skeleton white lighthouse is erected between Tor Point and Point Lemantin, but nearer the latter; from which, at an elevation of 95 feet above the sea, is exhibited a revolving red light every ½ minute; it should be seen 15 miles in clear weather.

On Fort Islet, from an iron tower 46 feet high, a fixed green light is shown, visible 11 miles.

Mooring Buoys.—Two large red mooring buoys which can be seen a long distance have been moored, respectively, ¼ and ⅜ mile westward of Fort Islet light and close to the range line indicated on the chart.

Vessels are not allowed to enter Port au Prince or any other port of the Republic between the hours of 6 p. m. and 6 a. m.

Tides.—It is high water, full and change, at Port au Prince at about 8h., and the rise is a little more than one foot, but after fresh easterly winds it is about half a foot less.

Pelican Cays and Reefs.—The bay of Port au Prince is almost blocked up to the northward by numerous shoals and small islets which protect the anchorage. The outermost are the Pelican Cays, which lie N. 43° W. (N. 45° W. mag.), distance 5 miles from Fort Alexander, and 2 miles from the nearest part of the eastern shore; they consist of five small low sandy and mangrove cays occupying a space of about ¾ mile and on their north side may be approached to ½ mile. Reefs extend S. 66° E. (S. 68° E. mag.) from the cays for 1½ miles, or to within ¾ mile of the eastern shore, and to the SW. to within 2⅛ miles of Lamentin Point. At about 1¼ miles to the southward of the cays there is a detached rocky shoal, ½ mile in length, named Sand Cay Shoal; it lies 3¾ miles from Fort Alexander, and on a clear day both it and the Inginac Shoals can be easily seen.

The Inginac Shoals, about a mile to the SE. of Sand Cay Shoal, are two rocky banks nearly dry, ¾ mile in extent and nearly connected to the low cays on the north side of the harbor.

Directions.—The channel for large vessels to the roads and harbor of Port au Prince lies between the SW. end of the shoals just described and the main, and in the narrowest part, between Sand Cay Shoal and Tor Point, it is 1½ miles wide. The soundings throughout are very irregular, varying from 4 to 20 fathoms, the ground in many parts foul, and the southern shore is skirted by a rocky ledge to the distance of nearly 400 yards.

Vessels approaching by St. Mark Channel, and being abreast Mou. Point, may choose either the inside or outside channel of the Arcad The former leads farther to windward, with the land wind, and Arcadins should be passed at the distance of about a mile an course continued until southward of the 1½ fathoms shoal lying 2 m

from the main, but it will be prudent at night for strangers to take the outside channel or that between the Arcadins and Gonave Island.

In passing to the westward of the Arcadins, Princes Peak, to the southward of the city, is a good mark; kept on a S. 49° E. (S. 51° E. mag.) bearing it will lead clear of them and up to Lamentin Point.

When Fort Alexander opens to the southward of Fort Islet S. 72° E. (S. 74° E. mag.), a vessel will be to the southward of the Pelican Reefs, and may then haul to the eastward for the roads.

Anchorage.—Good anchorage in the roads will be found with Fort Alexander S. 82° E. (S. 84° E. mag.) and Fort Bizothon S. 33° W. (S. 31° W. mag.) in 12 fathoms water, mud and sand. A more convenient berth for watering would be with Fort Alexander N. 86° E. (N. 84° E. mag.) and Fort Bizothon S. 13° W. (S. 11° W. mag.), in about 13 fathoms, clear ground; but be careful not to anchor on rocky bottom. In the center of the roads there is a small coral patch with 4 fathoms water on it, lying with Fort Bizothon S. 19° W. (S. 17° W. mag.) and Fort Islet about N. 78° E. (N. 76° E. mag.). There are other shallow patches, but they may be seen in clear weather.

Leaving this anchorage, if bound to the northward, it will be better to weigh about midnight with the land wind, which will most probably take a vessel to the Arcadins by daylight and through St. Mark Channel before the sea breeze sets in.

Winds.—The sea breeze in the outside channel generally blows from WNW., commencing in settled weather about 11 a. m. and continuing till 7 p. m. The land wind frequently comes off with a furious squall. These gusts come down off the high land with great violence, and in hurricane months reach half way across the channel between Haiti, Cuba, and Jamaica. They frequently give but little warning, and the navigator should therefore be constantly on his guard.

In the harbor of Port au Prince the easterly breeze generally commences at daybreak and after 12 o'clock changes to the westward. This change takes place at 1 or 2 p. m. and is frequently accompanied by a heavy squall. In the spring and summer months it generally rains between 6 and 9 o'clock p. m. The direction of the land wind varies with the trend of the coast.

Rochelois Bank.—If bound to the westward from Port au Prince or in beating up from that quarter through the Gonave Channel, great caution is required in approaching a rocky bank named the Rochelois, which is about 5 miles in length east and west and 3 miles in breadth.

ear the center of the bank are three or four small, low rocks, 3 feet bove water, called the Pirogues, whilst others barely uncover at low de, and when seen from a distance of 3 miles to the northward appear s some fifteen or twenty small rocky pinnacles. A few mangrove ushes grow on them. At ½ mile N. 21° W. (N. 23° W. mag.) of the rmer there is a patch with about 2 fathoms water on it. The sound-

ings on other parts of the bank are very irregular, varying from 4 to 10 fathoms, with sand between the rocky heads, and the bank is steep-to.

Vandalia Bank, a shoal with 6 feet least water over it, lies 2 miles south of the Pirogues. The bank is steep-to and the soundings on it are irregular, varying from 4 to 7 fathoms. To avoid this dangerous bank in the night, vessels should keep the shore on either side close aboard, observing that the coast of Gonave Island must not be approached nearer than one mile, while the coast of Haiti is perfectly clear and steep-to.

Léogane.—From Lamentin Point the coast takes a westerly direction for 8½ miles, when it bends round to the SW. for 5 miles to the port and river of Léogane. The first part of the coast has a depth of 10 fathoms about ¼ mile off shore, and off the latter part it is foul for about the same distance. Off the entrance to this river there is anchorage in from 9 to 10 fathoms, taking care to avoid a patch of 1½ fathoms about ½ mile from the shore; here the edge of the bank is about a mile to the westward. From Léogane the coast trends to the SSW. for 6 miles and then resumes a westerly direction.

Grand Goave Bay.—Between Léogane Point and Grand Goave Bay the coast is low and wooded, and off it there is anchorage in 7 or 8 fathoms water. Grand Goave Bay is about 8½ miles from Léogane Point, but it affords no good shelter. A short distance eastward of it there is a little wooded islet, and the town will be seen on the left bank of a small river.

Petit Goave Bay is separated from the above by a large bluff headland, 1,500 feet high. It is formed between Rocky Point on the east and that of Antonio on the west. On the west side of the bay is the Carénage, a small well-sheltered and safe inlet with 3 to 7 fathoms water, with 3 small islets at its entrance. The town is on the eastern side of the bay, and just abreast of it there is a small sandy islet, 300 yards off shore, called Anglais, or Poules. Half a mile N. 68° W. (N. 70° W. mag.) of it is a rocky bank with 2 fathoms of water on it. The passage between the islet and eastern shore carries from 3 to 13 fathoms irregular soundings. Between the Anglais Islet and Carénage Point the entrance of the bay is about one mile wide. It is sheltered from all but northerly winds; these are seldom strong, and Gonave Island partially shelters the bay in this direction. Three small rivers empty into the bay, from any of which good water may be obtained.

The Atlas line of steamers call here twice a month.

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Miragoane Bay lies about 12 miles westward of Petit Goave, a nearly midway between there is a remarkably clear spot on the side a mountain presenting the appearance of a narrow scorched grass fie the mountain rises from the shore to about 1,000 feet high, and at base are some conspicuous white cliffs. The apparent width of the trance is diminished by a reef which runs directly across from the

ern side, leaving a deep channel one mile wide between its end and the eastern point. The reef is dry in places, and on its western extremity is Black Cay. The anchorage is in 10 to 12 fathoms, with the fort bearing about S. 32° E. (S. 34° E. mag.). There is also a snug berth in the SW. part of the bay between two islets and the mainland, but it is very narrow. A spring of good water will be found in a cove 1¼ miles eastward of Miragoane. In the cove there are 3½ and 4½ fathoms of water, but a bar of 12 feet runs across its entrance.

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Rochelois.—The village of Rochelois stands inland, near the base of the peak of Miragoane; the point of the same name is about 3 miles westward of Black Cay with the river about 2 miles further on.

The Coast.—Five miles westward of Rochelois Point is the fort and town of Petit Rivière; 2¼ miles beyond this is a remarkable sandy cliff; then follows the Petit Rivière, and 3½ miles westward of the sandy cliff is the village of Anse à Veau. Thence the shore is composed of black perpendicular cliffs, about 20 feet high, for 9½ miles farther westward to another village called Petit Trou, which is about 3½ miles eastward of the entrance to Baradaires Bay. All this part of the shore is bold and steep-to, and affords no shelter. But there is anchorage for small vessels off the village in 2¼ fathoms water.

Baradaires Bay, which is sheltered on its northern side by the peninsula of Bec à Marsoin, appears wide, but is obstructed by a reef extending from the southern shore. This reef extends from some small cays near Picolet Point, in a northwesterly direction to within ½ mile of Bec à Marsoin. It is steep to and clear, with a channel for ships of the largest draft between it and the reef. A pilot is required, as the anchorage has many shoals.

Bec à Marsoin Peninsula will be readily recognized by the deep bay back of it. From its eastern point the coast consists of perpendicular rocky cliffs, about 20 feet high, much worn and fissured by the action of the sea. A low table-land covered with dense foliage rises from the rocky cliffs, decreasing in height toward Fantasque Point. Back from the coast the mainland is mountainous.

Three miles and a half to the westward of Bec à Marsoin Point there is a shallow bay, at the bottom of which is a short sand beach, the only landing place to the eastward of Fantasque Point. It affords no protection to vessels. There is a small fishing village near this sand beach.

From this bay the coast is rocky, with occasional sand patches until ear Fantasque Point.

Cayemites Bay.—The entrance to this extensive basin is about a ile in breadth, and lies between Fantasque Point and the Great Cayeites Island. The channel close under the island is deep and about a ile in width.

Au Bas Village.—The village of Au Bas is ½ mile to the westward Fantasque Point.

Reef.—From the shore of the village of Au Bas a reef extends to the west and WNW., a distance of 3½ miles, narrowing the channel between the reef and Great Cayemites Island to ¾ mile. The eastern part of the reef dries at low tide and shows only a few black heads at high water, the western part of the reef has several heads with only 2 fathoms water, but there are places which may be crossed in 3 fathoms.

A quarter of a mile to the southwestward of Au Bas is the first of a chain of small islands, covered with low mangrove bushes, and extending along the shore to the SW. for a mile. Between the islands and the main there is a boat passage.

Pestel.—Nearly 6 miles WSW. of Au Bas is Pestel, a town of some importance situated in a small inlet between the high hills. Very little of the town is visible from the sea, only two or three houses on the beach and a few more on the top of the hill.

Great Cayemites Island is 5 miles long, 2½ miles broad, 500 feet high, and thickly wooded; about ½ mile to the westward of it is Little Cayemites, a small islet 1½ miles long and ¾ mile broad, with a channel of 2 fathoms water between. From the latter islet Grand Reef sweeps outwards to the WSW., and connects itself to the shore about 15 miles to the westward of Fantasque Point, completely sheltering the bay from the northward.

There is also a passage, with 1¼ to 2 fathoms water, running north and south, for small vessels, westward of the Little Cayemites, over the white sand bank between it and Grand Reef. The latter is covered with about a foot of water, and on it are several rocks or small cays To the southwestward of Grand Reef there are two groups of cays covered with trees, which shelter the bay on the west. Near the coast there are various other cays and reefs.

Anchorage.—The first secure anchorage westward of Bec à Marsoin Point is in 7 fathoms, with Fantasque Point bearing N. 81° E. (N. 79° E. mag.), and the western end of the chain of islands extending from Au Bas, bearing S. 9° E. (S. 11° E. mag.). In this berth the reef, with only 2 or 3 fathoms water, is about 200 yards distant. Do not shoal less than 5 fathoms, as the soundings are irregular.

Large vessels may anchor in the bay close under the SW. side of Great Cayemites, or on the eastern side in Flamencos Bay, off a sandy shore and in any convenient depth. Small vessels may anchor close in shore.

Directions.—In entering Cayemites Bay from the eastward, keep about 600 yards distant from the shore of the peninsula. No bottor 20 fathoms will be found at that distance. As already mentioned, channel between Great Cayemites and the reef extending off Au B- ¾ mile wide, and has from 3 to 5 fathoms. There is deep water wi- 600 yards of Fantasque Point, and 10 fathoms at a mile west of it. not haul in round the banks to the westward of Fantasque Point be the west end of Great Cayemites bears N. 2° E. (north mag.)

channel westward of it is well open. There is a patch with a depth of 3 fathoms southward of Little Cayemites.

Patte Large Bay.—Between Cayemites Bay and the village of Jérémie the coast is clear of danger. In general it is rather low and covered with trees. Between them are some remarkable white cliffs extending about 4 miles east and west. To the eastward of the cliffs is Patte Large Bay, open to the north. Its mouth is 1,400 yards wide and obstructed by reefs, which small vessels only can cross, when they gain shelter under cover of the reefs. Patte Large, the western point, is foul, and here the cliffs above mentioned commence. Temporary anchorage may be had in 3 fathoms water, north of Patte Large, at 600 yards from the reefs which shelter it.

Four miles westward of Patte Large Point is the River Roseaux, at the eastern part of Grand Anse; this bay terminates westward in Jérémie Point, which is narrow, extends eastward about ½ mile, and shelters on the north the anchorage of the same name.

Jérémie Bay is a small open semicircular bay, and known by the village of the same name. The edge of soundings lies about ¾ mile from the shore, and on the bank before the town the depth is from 3 to 6 fathoms; but being exposed to the full force of the NE. winds, in strong breezes the sea breaks, and the anchorage consequently is not safe. The village is protected by a fort on the north point of the bay, and a small river empties itself into the sea at ½ mile to the SE. of the village.

The point is surrounded by reefs, which extends 400 yards eastward. To the south of the point and near the reef which borders it is another small reef, named Mouton, south of which is the anchorage, fit for small coasting vessels only, in 3 or 4 fathoms water.

The town contains about 6,000 inhabitants. Trade is carried on by four regular lines of steamers, principally by the Atlas line from New York.

The United States is represented by a consular agent.

Trou à Cochon.—The coast westward of Jérémie Point to Trou à Cochon, a distance of 1½ miles, is clear of danger and formed of steep cliffs. Trou à Cochon is a small bay, and a reef extends a short distance from its eastern point; it is somewhat sheltered from the north and has about 1½ fathoms water. At ¼ mile outside it there are 3 and 4 fathoms.

Sal Point is about 4 miles westward of Trou à Cochon, the coast between being formed of steep cliffs; 3 miles farther on is the small bay Clerc, open to the north, but in case of necessity can be used by all vessels; a rivulet empties itself into the bay. About 2 miles stward of Clerc Bay is that of Bon, fit for coasting vessels, separated m it by a large round promontory; a rivulet runs into it. Then fols another small bay and village, and 2½ miles beyond the latter is aloupe Bay, fit also for small vessels, and 4 miles farther on is Serne Point.

Seringue Point and Bank of Soundings.—Seringue Point, is a bold prominent headland, and eastward of it is a little bay which can be used by small vessels. From this point commences an extensive sand bank with irregular soundings, which sweeps off to the westward for 8 or 10 miles, and borders the coast southward as far as Cape Tiburon; the edge is abrupt, and the depth generally under 20 fathoms, decreasing to the coast; the water is so clear that the sandy bottom may be easily seen.

The bay between Seringue Point and Cape Dame Marie affords no anchorage, as the coast as far as the cape is skirted by rocks which extend off about ¾ mile. The bays between Capes Dame Marie and Tiburon are exposed to westerly winds, and afford no safety from September to March, when NW. winds prevail, during which period they are seldom visited.

Cape Dame Marie, the NW. extreme of the long narrow peninsula or neck of land forming the west end of Haiti, is rather low, and on its extremity there is a small hill. At 1½ miles westward of it the depths are from 14 to 17 fathoms, and 7 to 8 fathoms within a mile.

False Cape, a short distance south of Cape Dame Marie, is sometimes mistaken for it. A rock with 14 feet over it has been reported as lying 800 yards S. 20° E. (S. 22° E. mag.) of False Cape.

Dame Marie Bay is between this point and Point Rousselin. It is entirely open to the westward. The bay is clear, and in entering it the only danger to be avoided is the reef which skirts the shore between Cape Dame Marie and False Cape, at a distance of 300 yards, and the above reported rock.

Petite Riviére Village is on the NE. shore of the bay and the village of Dame Marie on the SE. shore. Half-way between them is a white bluff called the Twelve Apostles. A convenient berth is with this bluff bearing S. 66° E. (S. 68° E. mag.), in from 5 to 6 fathoms, ½ mile to one mile off shore. The prevailing wind under the land is generally ESE. to NE.

The Coast from Cape Dame Marie runs about S. by W. for 13 miles to Irois Point, with several small bays between. Rousselin Point, the south extreme of Dame Marie Bay, is formed of cliffs, and has a small round hill on it. Between this point and that of Baleine, south of it, are the three bays of Bayardelles, the two southern of which are separated by a bluff point, also with a small round hill on it, called Minister Head. In Bayardelles Bays there are no dangers, and in the northern one there is anchorage in 6 to 8 fathoms water, sand. Generally, all along this part of the coast, a vessel will find anchorage, as there neither shoals or any hidden danger, the water shallows as the c is approached, and the lead is a sufficient guide.

The Whale Rocks form a small rocky cluster rising just abo surface, from a white bank of 4 fathoms, about 200 yards in ex they bear S. 19° W. (S. 17° W. mag.), 7½ miles from Cape Dame M.

and lie ½ mile from the shore, with a clear 5½-fathoms channel between; about 200 yards outside them the soundings are 11, 10, and 7 fathoms, hard bottom, probably coral. The sea always breaks on them.

Boury Point is a remarkable bluff brown cliff, with a small rock awash, about 400 yards off. The bay of the same name is formed between it and Baleine Point north of it, where there is anchorage in 6 or 7 fathoms water at ½ mile southward of the Whale Rocks.

Nault Bays are formed between Boury Point on the north and Hospital Point at 2 miles south of it; the northernmost and largest of these bays affords very good anchorage. At a short distance within Boury Point is the town, overlooked by lofty mountains, one of which terminates in a remarkable peak. Not far from the south end of the town may be seen a little rounded height rising abruptly from a cliff on the shore and crowned by a fort. The shore is quite clear, the soundings regular, and the most convenient anchorage for vessels of light draft is in about 5 fathoms, with the peak in line with the tower of the village church, bearing about N. 75° E. (N. 73° E. mag.). Water may be obtained from a river which empties itself into the northern bay south of the village. Hospital Bay lies between the point of the same name on the north and that of Laborie on the south. It is clear of danger, and in its middle there are 4 and 5 fathoms water.

Pierre Joseph Point.—The Bay of Laborie, southward of the former, terminates on the south in Pierre Joseph Point. At ¼ mile from the point is an islet on the extremity of a reef, which is connected to it, and skirts all the southern part of Laborie Bay. Coasting vessels only can anchor in this bay in 2 or 3 fathoms water, south of Laborie Point, where it is clear of danger. There is anchorage in 8 or 9 fathoms water 1½ miles from the shore.

Pierre Joseph Bay is to the northward of Ibard Point. It is sheltered to the northward by the point and island of the same name. The point is low and sharp, and the islet is connected with a reef which skirts the entire shore of the bay as far as Ibard Point. The reef is steep-to. In the northern part of the bay there are several hidden dangers. The bay is surrounded by high land. At the foot of these hills and along the shore, where there is a sandy beach, are the scattered houses of the village of Pierre Joseph. To the southward of the village a river affording good water empties into the bay.

A small vessel anchoring in Pierre Joseph Bay should bring the southern houses in the village to bear S. 88° E. (east mag.) to avoid e above mentioned dangers and anchor in 18 feet of water, with the let bearing N. 10° E. (N. 8° E. mag.).

Large vessels should anchor in 7 fathoms, with the islet bearing N. ° E. (N. 56° E. mag.). When the sky is clear the bottom can be dis-ctly seen and the dangers avoided.

Espagnol Bay.—Its northern limit is Ibard Point. Its shore is dered by a white sand bank or reef extending 200 yards off shore.

This bay is quite small and does not afford a desirable anchorage. Large vessels may anchor abreast it in 6 or 7 fathoms.

Bigie and la Croix Bays.—Between Fanchon and Irois Points are the two bays of Bigie and la Croix, separated by a remarkable bold conical point which rises abruptly from the sea. The shore of Bigie Bay is of sand, and a house stands in the middle of the bay on one of the projections or spurs of the high land of the point. The shore of la Croix Bay is also of sand, and a rivulet runs through it; to the NE. of its mouth a house stands on a hill. These two bays afford no shelter whatever with westerly winds, but anchorage will be found in 7 or 8 fathoms water, at ¾ mile from the shore, or farther out in 10 or 12 fathoms, sandy bottom, at 1½ miles off.

Irois Point is the western extreme of Haiti, and, although not high, may be distinguished by a small hill on its extremity, which from a distance has the appearance of an island. The point is steep-to, and both it and the bay are clear of danger.

Irois Bay, about 2 miles in breadth and ½ mile deep, is formed between the point of the same name on the north and Cape à Foux on the south. In the NE. part of the bay is the village of Irois, standing above a small plain, irrigated by a river of good water. A little southward of the mouth of this river is a small group of black rocks detached from the shore, and off a white sand bank. At ½ mile southward of the rocks is another rivulet. The bay is clear of danger, and in the southern part of it there are from 5 to 8½ fathoms water. On the line of the two entrance points there are 8½ to 10 fathoms, sandy bottom, and the depth gradually diminishes to the shore. Several small black rocks are visible near the shore in the southern part of the bay. A vessel may round Irois Point at a short distance, and anchor in 7 or 8 fathoms water, sand and shells, with the largest black rock bearing about S. 71° E. (S. 73° E. mag.), distant 800 yards; or in 5½ or 6½ fathoms, sand and mud, with the large black rock S. 7° W. (S. 5° W. mag.), distant ½ mile. Although the bay has good anchorage, NW. and SE. winds cause a heavy swell to roll in, which renders it uneasy, and landing often difficult.

Carcasses Bay, between Cape à Foux on the north and Carcasses Point on the south, about ¾ mile apart, has 6 and 7 fathoms water at its entrance, which diminishes as the shore is approached. At the head of the bay three rivulets empty themselves, and to the north is a house on a hill. The land which encircles this bay is very high, as at all the others of this part of the coast of Haiti. Small vessels anc in the middle of the bay in 5 or 5½ fathoms water, sand and mud. La vessels may anchor at 1¼ miles from the points of entrance in 11 or fathoms.

Cape Tiburon.—Carcasses Point, and that of Locos, a little so of it, appear at a distance to be one large bold point which termin in Cape Tiburon. These three when seen at a distance appear as c

and are known under the general name of Cape Tiburon. The real Cape Tiburon is easily known by its appearance, as it forms a massive, lofty promontory, rising abruptly from the shore to the height of about 700 feet, and then gradually ascending to the rounded summit of a mountain 2,850 feet high, about a mile from the coast. This mountain, called Tiburon, is at the extremity of the great range of la Hotte, which extends from west to east far into the interior, increasing rapidly in height, a lofty peak about 8 miles eastward being 4,178 feet above the sea.

Locos Point is skirted by a reef at the distance of 200 yards, and several heads of rocks are uncovered. The reef continues along the coast as far as the entrance to Tiburon Bay, and is steep-to; southward of Cape Tiburon foul ground extends for nearly ½ mile. Near it there are 11 and 12 fathoms.

Tiburon Bay.—From Cape Tiburon the shore takes an ESE. direction for 1½ miles to a bluff rocky point, when it trends E. ½ S. 3 miles, then turning sharply to the SSW. for ¾ mile to Burgos Point, and forming the bay of Tiburon. The latter point is of moderate elevation, and skirted by a reef at the distance of 200 yards, which continues along the coast eastward for a mile.

The north shore is bold, backed by high hills; at the head of the bay there is a small, three cornered plain, with high land on two sides. The village of Tiburon is in the SE. angle of the bay, protected by a small battery, and the river of the same name empties into the sea north of the village. The anchorage is not sheltered toward the west or south. Small vessels can find shelter only from southerly winds north of Burgos Point and abreast of the village.

No difficulties present themselves in entering this bay, except those occasioned by the flaws and heavy squalls which come down off the high land. There is no danger to be avoided but the reef along the shore near Cape Tiburon and that off Point Burgos.

Supplies.—Water is easily obtained from the river, the mouth of which is marked by the five gun battery which defends the shore. Wood and fresh provisions can also be procured.

Milieu Bay, sheltered from NW. round north to SE., is formed between Burgos and Aigrettes Points, and midway there is a remarkable white cliffy point called Tapion. Aigrettes Point, with a small round hill on it, is composed of white cliffs of moderate height; there are some houses on the hill, and at a distance it appears as an island. Six miles eastward of Point Aigrettes is that of Grande; the coast between is low and here and there formed of a dark shingle beach. The land at the back rises rapidly and leaves between it and the sea a narrow strip of land generally intersected with lakes. The shore all along is skirted by a reef, a portion of which is uncovered. A white sand bank also borders the shore at a distance of from ¼ to ½ mile.

At 1½ miles eastward of Aigrettes Point is Bucan Viejo, an opening

in the reef of about ⅛ mile in breadth, leading into an anchorage of about ½ mile in extent, where small coasters find shelter from the prevailing winds. At the entrance there are 3½ to 4½ fathoms water, which diminishes inwards to 2¼ and 1¼ fathoms. In the middle of the harbor there is a small sunken rock. It is easy to distinguish the reef and white sand bank on this part of the coast, but it should not be approached unless compelled to do so.

The bank of soundings extends 2 miles off with 6½ to 11 fathoms water on it, and in case of necessity anchorage may be had off Milieu Bay, and also off the coast as far as Grande Point, in 6, 7, or 8 fathoms, but there is no shelter and generally a heavy sea.

Anglais Bay is unsheltered and inconvenient. Temporary anchorage may be had in 6 or 7 fathoms of water SE. of some houses on the shore. Half a mile from these houses the River Anglais empties into the sea, but the surf is too heavy to obtain fresh water.

Acul à Jean is a small bay. At the head of it, surrounded by high land, is a village. Like all these anchorages it is entirely open to the southward, but vessels may anchor one mile off shore in 7 or 8 fathoms of water.

Salée Bay is immediately to the westward of the Three Rivers Bay. It is quite small, surrounded by high land, and remarkable for two white bluffs, which form the points of entrance. A river of the same name empties into the bay, and on the shore is a small village.

The Bay of Three Rivers, so called from the three small streams which empty into it, is 2 miles in a northeasterly direction from Port Piment. It is entirely open to the southward, but with winds from the north or east it affords temporary anchorage. There are no dangers in it. At the head of the bay and back of the beach there is a village on a remarkable hill 150 feet high, the base of which is formed of red bluffs.

Point Piment, sheltered from NW. round by north to SE., is 2 miles SE. of the bay of Three Rivers. In the SE part of the bay a small river runs into the sea, and a village stands on a prominent point which terminates in the south extreme of the port. At a mile from the land there are 7 fathoms water, which diminishes gradually to 1¼ fathoms at 400 yards from the shore. A vessel may anchor in 6 or 7 fathoms, with the village bearing about S. 66° E. (S. 68° E. mag.) one mile from the shore.

Coteaux Bay.—One mile SE. of Port Piment is the small bay of Damassin, which terminates to the south in Coteaux Point. A small riv runs into the NE. part of it. One and a half miles farther on is the bay Coteaux, formed between the point of the same name on the north ar that of Roches on the south. Reefs extend 300 yards from these poin and also from a third point in the bay, south of the village. The vill of Coteaux stands partly on the shore and partly on the hills at the ba A rivulet empties itself north of the village. The anchorage is in t

north part of the bay in 5 or 5½ fathoms water, westward of that part of the village standing on the shore. One hundred yards from the shore there are 1¼ fathoms water. Small vessels entering should avoid the reefs extending from the points.

Juif Bay.—The bay of Roche à Bateau follows that of Coteaux, and affords similar anchorage. Here are a few houses, and in the NE. part a river runs into the sea. The bay of Juif, 1½ miles SE. of the former, is 1⅞ miles wide at the entrance, and the point of the same name on the north is formed of steep cliffs. At the head of the bay a village stands on a bold, round, prominent point, and to the north of it a river empties itself after dividing into two arms just before entering the sea. The land which surrounds the bay is very high and forms two ravines, which extend into the interior. A vessel may anchor in the middle of the bay with the village bearing about east, in 5 or 5½ fathoms water.

Port Salut.—The bay of Drick is separated from the preceding by a large broad point composed of high cliffs, is similar to that of Juif, and a rivulet runs into it. The anchorage is in the middle of the bay in 4 or 4½ fathoms water. Port Salut is formed between a low point on the north and a bluff one with a small eminence along its eastern side on the south. Here is a village, and three rivers run into the sea, one on the north, another at the head, and one in the south part of the bay. To the NW. of the village is a remarkable white cliff, and off it anchorage for small vessels. Two miles NW. of the white cliff there is a dry sand bank at ½ mile from the shore; and a coral bank with 2⅔ fathoms water on it lies in front of the village at nearly one mile from the shore.

Gravois Point.—From Port Salut the shore trends southward to Gravois Point, which is thickly wooded and about 60 feet above the sea. It is steep-to, having a depth of 48 fathoms at the distance of ⅓ mile. From Burgos to this point the direct line is about SE. by E. ¼ E., and the distance 33 miles; the coast between forms a bight, and although possessing considerable features, is imperfectly known. It is much exposed to southerly winds, which almost always send in a heavy sea.

East Coast.—Cape Samaná.—See page 253.

Samaná Bay has been thoroughly surveyed. Navigators, by consulting the chart and keeping a good lookout from aloft for the coral heads, will have no difficulty in entering it. The best entrance is along the northern coast where the least depth is 5 fathoms, except on Jean Bart Reef with 3¾ fathoms and a rocky patch to the southward of Carenero Cay with 4½ fathoms, but these places can easily be avoided and a depth of 6 fathoms carried to the head of the bay.

Coast.—About 2 miles southward of Cape Samaná, the bold rocky shore takes a SW. direction for 6½ miles to Balandra Head. The latter is a remarkable red cliff lying at the foot of Mount Diablo, which rises to a peak 1,300 feet high, 1½ miles inshore.

Nearly one mile to the NE. of the head, at the south end of a small

sandy bay, there is a remarkable cliff, with 3 large fissures, and between it and the head, close to the shore, lies a small rocky islet, called Piedra Grapin. A small reef breaks at a short distance off Cape Samaná, but the shore just described is clear and steep-to, until abreast of Balandra Head, off which there are two small cays. The depth here decreases suddenly to 6½ fathoms a mile off, on the Canandaigua Bank, which extends from Balandra Point 5½ miles to the SE. This bank is narrow, with 5½ fathoms least water over it.

To the southward of Canandaigua Bank a shoal with 5½ fathoms on it has been discovered; its extent has not been ascertained, but is supposed to connect with the bank extending from the south shore of Samaná Bay.

From Balandra Head the coast turns sharply to the westward, and at 1$\frac{3}{10}$ miles beyond it is Cacao Point, a low bluff; foul ground extends about 200 yards from the point. At 1¼ miles farther westward is Flechas Point, on which there are some huts, and a little eastward of it two small cays, the larger of which is called by the same name.

Levantados Cays.—Nearly a mile from the south shore of Samaná Peninsula, and about 2¼ miles westward of Balandra Head, are the Levantados Cays. The largest (Levantado) is nearly ½ mile long east and west, 108 feet high, and thickly wooded. About 100 yards eastward of it is Chinchiline, a small low cay; and at about 200 yards northward of it Pascual, a small round islet, steep-to on its north side. Arenas Cay is SW. of the others. These cays are joined by a reef, on which there are from 3 to 7 feet of water. The best anchorage is east of the reef. About ¼ mile to the NW. of the latter is Jean Bart Reef, on which there are 3¾ fathoms water; between it and the north shore the channel is about ½ mile wide, with irregular soundings, varying suddenly from 6 to 12 fathoms.

From Flechas Point the shore trends to the NW. for a mile, forming Chico Bay; in its center is Chico Shoal, which extends out nearly ¾ mile from the shore, is steep-to, and easily seen. There is anchorage under Flechas Point between it and the reef, and also in the west end of the bay, which is protected by the reef. The channel into the latter lies to leeward of the reef, between it and a ledge which runs off from Chico Cay, but it is so narrow that large vessels must tow or warp in.

Clara Bay is clear, and affords good anchorage. The bay is $\frac{7}{10}$ mile wide between Lirio and Gorda Points, both of which may be approached within 200 yards. A good berth will be found, with about 10 fathoms of water in the middle of the bay and just within a line drawn betw the two points.

Port Santa Barbara may be described as an inlet running abou mile east and west, and ¼ mile in breadth. The north shore of the b is formed of irregular hills, which rise a short distance from it to a c siderable elevation. The head of the bay is low and swampy, and

south side is sheltered by a reef, several cays, and dry rocks, which extend a little more than a mile to the eastward from Escondido Point.

The entrance to the harbor lies between Gorda Point and Paloma Cay. A village of the same name stands at the head of the bay, at the base and on the sides of some small hills, which are almost hidden from the eastward by a headland.

Paloma Cay is the most easterly of the chain extending from Point Escondido, and is 43 feet high, with steep sides, the summit being covered with bushes. From the east end a shallow ledge runs off ¼ mile in a southeasterly direction. Its extreme end, with a depth of 25 feet, lies S. 34° W. (S. 34° W. mag.), ⅛ mile from Gorda Point, leaving the entrance to the channel between it and the point less than ¼ mile wide.

North of the western extremity of Paloma Cay and nearly in mid-channel there is a bank with 4 fathoms of water on it, with a narrow channel on either side.

Carenero Cay, well wooded, has a hill at each end, the eastern being 126 feet high. A wooden pier about 40 feet long, with a depth of 18 feet at low water at the extremity, extends from the north side of the eastern part of this cay. The American mail packets use it as a coaling pier. Between this cay and Tamiso Cay the ground is foul, with only a boat passage.

From the north side of Carenero Cay a reef extends nearly 300 yards and is steep-to. To the northward and in mid-channel are two patches having only 3 fathoms on them.

Aguada Bay is a small cove in which anchorage may be found for small vessels.

Gomère Bank.—The western limit of Aguada Bay is called Punta de la Cruz. Immediately south of it, at about 150 yards distance, is a rocky shoal, nearly awash, called the Gomère Bank, with deep water on either side, and between it and the head of the bay is the inner anchorage, sheltered from all winds and having a depth of from 3½ to 5 fathoms.

Castillo Point, on which Fort Barbara stood, is a steep bare cliff of reddish color, about 40 feet high, with an old wooden house on the summit.

Directions.—Being at a distance of 3 or 4 miles eastward of Balandra Head, there will be no difficulty in recognizing it by its red color and the detached rock lying at its base. This headland should be rounded at a distance of from ¼ to ½ mile, and a course steered alongshore to the westward, taking care not to shut Balandra Head in with Cacoa Point until past the Chico Shoals. As soon as the Chico Cay bears N. 33° E. (N. 33° E. mag.) the reef of that name will have been passed when, if bound to Santa Barbara, the vessel may be hauled up toward Gorda Point, taking care in passing to the westward of it to keep the eastern hill of Carenero Cay open to the northward of Paloma Cay, in order to avoid the ledge to the eastward of the latter.

Having passed Gorda Point, the deepest water will be found on the south side of the channel, along by the edge of the reef until abreast of the west end of Paloma, when haul toward Aguada Bay to avoid the shoal off Carenero Cay. When the west end of that cay bears S. 53° W. (S. 53° W. mag.) bear away to the westward for the inner anchorage. Keep the southern side again aboard to clear the Gomère Bank, southward of the west point of Aguada Bay, and anchor in 5 fathoms water, muddy bottom, with Castillo Point bearing N. 30° E. (N. 30° E. mag.), end of Great Carenero Cay S. 42° E. (S. 42° E. mag.), and west end of Tamiso Cay S. 31° W. (S. 31° W. mag.). In the absence of a pilot the eye must be the guide, and if the sun is high and astern of the vessel, the shoals may be seen from aloft.

Caution.—As the land and sea breezes are quite regular here, except for short periods in the winter when strong NE. trades prevail, a sailing vessel should only attempt to leave Port Santa Barbara with the land wind.

Should the sea breeze spring up before the vessel reaches Balandra Head, great care must be taken, if to the eastward of the Levantados Cays, not to bring them to the northward of west (west mag.) until abreast of Balandra Head, in order to avoid the reefs which stretch to the SE. across the mouth of the Gulf of Samaná, and on which many vessels have been wrecked.

Tides at Santa Barbara de Samaná frequently run at the rate of 1½ miles an hour, and during the rainy season a velocity of 3 miles is sometimes attained. In leaving the harbor with a sailing vessel, attention must therefore be paid to the time of the tide.

The Town of Santa Barbara contains about 1,000 inhabitants.

The United States is represented by a commercial agent and vice-consular agent.

Supplies.—Fresh meat, vegetables, fruit, and bread can be readily procured at moderate prices. Water can be obtained at Aguada Bay and is said to be wholesome. There is a small quantity of coal kept on hand for the use of the Clyde steamers. Coaling is rapid, by baskets, with no interruption on account of the weather.

Steamers.—An English steamer connecting with the Royal Mail steamers at St. Thomas calls twice a month; an American steamer once a month.

Port Charges for ports in Samaná Bay:

Vessels which do not receive or discharge cargo are not required to pay ship's dues, but pay harbor master's fees at the rate of 3 cents p ton. Regular steamers pay ship's dues only at the rate of 30 cents ton on cargo delivered and received.

Vessels bringing coal only and leaving in ballast are only requi to pay half these dues.

	Per American ton.	
	Ship's dues.	Harbor master's dues.
Vessels of more than 100 American tons, other than regular steamers, are required to pay on their entire burden, if discharging or receiving:		
One-half or more of their burden	$0.30	$0.05
One-quarter and up to half	.20	.04
Less than a quarter	.10	.03
Less than one ton		.03
Vessels of only 100 tons, which receive or discharge one ton or more of cargo, without regard to amount of cargo, are required to pay their entire burden:		
Above 75 and up to 100 tons	.23	.05
Above 60 and up to 75 tons	.20	.05
Above 45 and up to 60 tons	.16	.05
Above 30 and up to 45 tons	.13	.05
Above 15 and up to 30 tons	.10	.05
Above 15 tons or less	.06	.05

Fees of health officer and fort fees.

	Fort fees.	Health officer.
A ship	$2.50	$5.00
A brig	1.25	5.00
A top-sail schooner	.60	3.00
Any other schooner	.30	3.00
A boat	.12	3.00

Pilotage.—When a pilot is used the charges are $1.25 per foot inward and 75 cents per foot outward.

Sanchez (Las Cañitas) is situated in the bight at the NW. corner of Samaná Bay. The village may be recognized by the houses and railway company's buildings, from a distance of 10 miles.

In 1888 the railway was complete to La Vega de Concepçion, about 62 miles inland, and is in progress of construction to Santiago, 25 miles further.

There is a mooring buoy in the roads, but it lies close west of a 10-foot patch, situated 1,200 yards S. 25° E. (S. 25° E. mag.) of Hernandez Point, and must not be used as moorings.

Good anchorage with excellent holding ground will be found with Gorda Point bearing N. 80° E. (N. 80° E. mag.) and the railway depot N. 28 W. (N. 28° W. mag.), in 7½ fathoms; vessels of lighter draft may be anchored further in and westward of the buoy.

Landing is difficult at low water, especially with large ship's boats.

Supplies.—Fresh beef, vegetables, and fruits can be obtained at moderate prices; abundance of fish may be caught; good water may be had from the numerous rivulets, but it is difficult to ship in large quantities.

The current money is Mexican dollars.

The Climate is damp but not unhealthy; fevers occur but are not of a dangerous nature.

Between 6 and 7 a. m. a light westerly breeze arises and lasts until about 8 a. m., when it dies away. The sea breeze sets in from SE. to

east about 10 a. m. and lasts until 4 p. m., bringing a swell with it; followed by a calm until 5 to 6 p. m., when a light NE. to east wind continues during the night.

Directions.—Follow the directions given for Port Santa Barbara until past Chico Shoals; thence continue the course S. 87° W. (S. 87° W. mag.), keeping Balandra Point open of Cacao Point on the opposite bearing. This will lead between the shoals southward of Great Carenero Cay; from which steer S. 73° W. (S. 73° W. mag.), keeping a good lookout for the uneven ground southward of Corozos Cay. After passing these a course may be shaped to pass one mile south of Gorda Point.

The Yuna River, which empties into the western part of Samaná Gulf, is obstructed at its mouth by a sand bar, with only 2 feet of water on it. Boats may ascend it to within a few miles of Cotuy, 40 miles in the interior.

Barracota River empties into the southwestern part of the bay. The mouth is obstructed by a bar with from 2 to 5 feet on it. This river is navigable for boats 5 or 6 miles from its mouth.

The Bay of San Lorenzo is well sheltered and sometimes visited by coasters.

Savana-la-Mar, on the south side of the gulf, is a scanty collection of huts. Landing, even from a small boat, is difficult on account of the mud flats which reach off from the shore.

Port Colorado.—No directions can be given for this port. The River Capitan empties into it and the coast between it and Port Jicaco is obstructed everywhere with reefs on which are several cays and islets. Two rivers, called the Culebras and the Magua, empty into the gulf between Jicaco and Colorado.

Port Jicaco, or English Port, lies on the south shore 11 miles west of Cape Rafael.

The harbor lies between Jicaco Point on the east and Manati Point on the west. The Rivers Yeguada, Guanabo, Real, and Jayan empty into the harbor, which is principally resorted to by coasters to load logwood and mahogany.

There is a small rocky islet, called Jicaco, near the entrance, for which it is an excellent landmark, as well as for the leeward and windward channels into the port. To enter the harbor bring this islet between the peaks of a high mountain inland, and steer in on this bearing S. 11° W. (S. 11° W. mag.). Good anchorage will be found in 5½ or 6 fathoms of water inside the reef, about ½ mile from shore.

Caution.—A stranger should not attempt to enter Port Jicaco without a pilot, nor, indeed, should he run inshore to leeward of Cape Rafael without one.

Medina Luna, Bardo Perdido, and other shoals, bar the entrance to Samaná Bay between Cape Rafael and the Levantados Cays; there are several deep-water tortuous passages through these reefs, but a glance

at the chart will deter any attempt at using any one of them; the only safe course is to the northward of the Levantados Cays.

Cape Rafael, the southern point of the great gulf of Samaná, is quite low; but 2 miles inland from it there is a remarkable conical hill, called Mount Redondo, which at a distance from NW. and SE. has the appearance of an island. The coast in the vicinity of Cape Rafael is low and foul, and should not be approached nearer than 3 miles.

Coast.—From Cape Rafael to Cape Engaño the coast runs in nearly a straight line SE. This part of the island abounds in mahogany and logwood, and there are several small ports and bays where small vessels load with these woods, but as the shore is skirted by a broken reef and exposed to the wind and sea, these small anchorages are not only difficult to approach, but are dangerous even in the fine season.

There are several small cuts in the reef through which vessels of 6 feet draft may pass, but larger vessels must lie one mile or more offshore.

Frequent accidents occur, and communication with the shore is sometimes interrupted for weeks at a time.

There is no safe anchorage between Cape Rafael and Port Macao.

Port Macao.—To the northward it is protected by a reef which joins two remarkable rocky islets. The eastern or windward one, called Cabezote Barlovento, lies close off Macao Point, with a boat channel between them; the other, Cabezote Sotavento, or el Infiernito, lies about ½ mile from the shore and to the eastward of the entrance of the River Anamuyá, where there is said to be an excellent oyster bed. The anchorage for coasters is about ½ mile to the northward of the reef, and their cargoes are brought off by boats from the Anamuya River.

Mahogany and logwood are also loaded here from the Rivers Maymon and Nisibon, the first 5 miles and the second 14 miles NW. of Port Macao.

Arena Gorda.—This anchorage is the first one to the SE. of Port Macao. There are three small cuts in the reef here through which a small vessel not drawing more than 5 feet may pass to the inner anchorage. Larger vessels lie from one to 1½ miles offshore in 10 to 12 fathoms of water.

Ranchitos Bay, 2 miles SE. of Arena Gorda, has two small cuts in the reef, with 4 or 5 feet of water in them. The anchorage is 2 miles off shore in a depth of from 11 to 12 fathoms.

Babaro, SE. of Los Ranchitos, is one of the best of these anchorages, as the reef lies near the shore and the sea is smoother. The anchorage for large vessels is 1½ miles offshore in 10 or 12 fathoms of water.

Cabeza de Toro is the first anchorage to the westward of Cape Engaño.

Through the reef in front of this port there are two passages, and in the lee one, called la Nayba, a depth of 10 or 12 feet may be carried.

Large vessels anchor in 10 or 12 fathoms of water, outside, with a bottom of sand and rock. This place is much frequented by wood droghers, and large quantities of mahogany are shipped.

Cape Engaño, the eastern extreme of the island of Haiti, is a long, low point from which a ridge of rocks runs 3 miles in a northeasterly direction.

A short distance inland there are two small hills which, seen from a S. 79° W. (S. 79° W. mag.) direction, at a distance of 17 or 18 miles, present the shape of a wedge.

Between Cape Engaño and Point Espada the coast is low, and soundings extend some distance off shore, with a white sandy bottom.

There are several small cuts through the reef which skirts this part of the shore and some small sandy bays, where mahogany is shipped, but, like similar places between Capes Rafael and Engaño, large vessels are obliged to anchor 2 miles offshore, exposed to wind and sea.

Punta Cana is the first anchorage south of Cape Engaño. The shore is inclosed by a reef, which obliges vessels to anchor, according to their draft, from a mile to 1½ miles from the shore. There are two openings in the reef, through which the boats pass to carry cargo to the sandy beach. These openings have 6 feet of water in them, are narrow and obstructed by coral rocks, requiring great care in navigating them. The surf is heavy on this coast, and with a northwind prevents communication with the shore.

Caution.—Breakers are shown on H. O. charts with a query, about 6 miles off Punta Cana.

Pantanal and Guayacanes are ports similar to Punta Cana. Upon the shore of these ports are some houses; they are inhabited by laborers employed in cutting mahogany from the adjacent forests. Pantanal is 3 miles south of Punta Cana.

Point Espada, the SE. extreme of the island, is a remarkably bold cliff of moderate height. Its extreme point is low and prolonged by a bank or reef which gives the water a whitish color. Banks of this nature are frequently met with in different places off the coast of Haiti and are called Placeres Blancos, or white grounds. They are very often strewn with sharp-pointed rocks.

Tides.—At the anchorages outside of the reefs on the southeastern coast of Haiti the flood tides generally run to the SSW. for nine hours, with a strength of 3½ miles an hour, and the ebb tide for 2½ or 3 hours runs NE. by N. The tides in this vicinity are, however, very variable in their strength, duration, and direction; sometimes ebb and flood each last six hours. Sometimes again the ebb lasts longer than the flood and in this case the NE. current is stronger than that running to the SE.

Yuma Bay Anchorage is good, but of limited extent, exposed to SE. winds, and is in front of a little sandy beach called "Playeta," to the windward point of the mouth of the river, in 12 fathoms of wa-

The mouth of the river is obstructed by a bar with 8 or 9 feet of water on it, but inside there is a depth of 12 feet.

Fresh Water is obtained by ascending the river as far as Derrumbadero, but this can only be done in small boats.

Anchorages.—Vessels will find good anchorages between Port Yuma and False Cape in 9 to 12 fathoms of water, but they will be exposed to NE. winds.

The Tide runs with great velocity, especially about Point Cuevita, where it has a velocity of 4 or 5 miles.

False Cape.—The land about this cape is formed by precipices of coral rocks, in the form of walls with a height of 150 to 200 feet. False Cape is the southern point of this high land, and seen from the northward presents the profile of a grotesque figure.

Current.—Off this coast a strong westerly set is often experienced.

Granchora Anchorage.—Vessels are compelled to anchor several miles off, either to the leeward of Catalinita or to the leeward of the reef which extends from Granchora to that island. The surf is generally so great on the beach at this place that weeks may elapse before cargo can be taken on board.

Martel is a port similar to Granchora.

Vessels about to visit any of the numerous small places on the east coast or between Point Espada and the city of Santo Domingo generally take a pilot at the latter place, which is the port of entry for all these places.

Saona Island may be justly said to form the southeastern extreme of the island of Haiti, for the space between them is so filled with reefs and shoals as to leave only a boat passage. It is covered with trees. Its NE. point is formed of steep bluffs; its SE. point is quite low, and a dangerous ledge extends a distance of 3 miles in the same direction. The sea breaks on this ledge 1½ miles off shore; farther out the depths are 4 and 6 fathoms.

At a distance of 5 miles off the southern shore of Saona there are from 7 to 10 fathoms of water, and a ship should keep at least this distance when to the southward and eastward of the island.

Cabello Bay, three miles to the westward of the SE. point of Saona, is a good anchorage off a sandy beach.

Supplies.—Wood and water can be obtained here.

Alert Bank.—In approaching this anchorage great care must be taken to avoid a dangerous rocky head called the Alert Bank. This rock has only 4 feet of water on it, and the sea breaks in heavy weather. N. 45° W. (N. 45° W. mag.) of Alert Rock there is another rocky head, with from 9 to 18 feet of water on it, with a deep channel between the two dangers.

The western coast of Saona Island is lined with reefs and dangers, especially toward the northwestern point and near Palmilla Point on the mainland.

Catuano Pass.—There is only 7 feet of water in its shoalest part and is narrowed by a bank of mud and coral rocks.

Catalinita Island—Between this island and Saona a dangerous reef extends, called the Horseshoe. Near Saona there is a cut in this reef through which a depth of 6 fathoms may be carried into a sheltered anchorage with muddy bottom, having Catalinita Island bearing N. 11° E. (N. 11° E. mag.)

Caution.—The north shore of Saona is steep-to till this reef is approached, but the sea is so heavy and the currents so strong and irregular that this part of the island had better be avoided; indeed, Saona Island should not be approached from any direction nearer than 6 miles, except in cases of necessity.

Kurea Reef is from 1,000 to 2,000 yards long, 200 yards wide, and nearly awash at low water. This may be a continuation of the Alert Rock mentioned above. Until more accurately defined, navigators should give the island a good berth.

Bank.—The captain of the Spanish brig Arina, whose draft was 10 feet, reports having struck several times when 9 or 10 miles southward of Saona Island.

Currents.—In the Caribbean Sea the currents are, as a rule, greatly influenced by the direction and strength of the trade winds. The prevailing set is between NW. and west, but at the full and change of the moon, and about the autumnal equinox, an easterly (weather) current is occasionally found on the south coast of Cuba, north and south coasts of Jamaica, south coasts of Haiti and Puerto Rico, and on the north shore of South America as far east as Trinidad.

Guaraguao is an anchorage 8 miles to the southeastward of the Quiabon River, and is seldom visited.

Bayahiba is a few miles to the northwestward of Palmilla Point. A vessel can anchor in 6 or 7 fathoms of water about one mile off shore, well sheltered from the SE. by Saona Island and Palmilla Point.

Quiabon River is obstructed by a bar, sometimes dry and rarely having more than 3 feet of water on it. The anchorage off the mouth of this river is only an open roadstead, but with good holding ground. The best berth will be found with the two points of Minos and Aguila in one, the latter being the eastern point of entrance to the Romana River, and with two cocoa nut trees on shore in front of the largest house in the village bearing north (north mag.).

The ground to the eastward of this bearing is rocky, and there is s[illegible] also to be in that direction a rocky shoal with only 13 feet of water [illegible] it. In the rainy season good water can be obtained by going 2 mil[illegible] up the river. The tide rises about 2 feet.

Between the mouth of the Quiabon and the Romana River, a sh[illegible] distance to the westward, there are three small loading places, cal[illegible] Minos, Burgado, and Caleton. The first two are only fit for small v[illegible]

sels, and the latter is entirely unsheltered. The anchorage for large vessels off Minos has 19 fathoms of water.

Romana River.—The entrance may be known by the village on the hills on the right bank, 180 feet above the sea. It empties into the sea between bold limestone bluffs, and its entrance is only about 200 yards wide. Large vessels, however, can enter it, and it is one of the best and most sheltered anchorages on the southern coast of Santo Domingo.

The only danger to be avoided is a small rock, with 6 feet of water on it, lying about 75 yards S. 45° E. (S. 45° E. mag.) of the western point. A short distance eastward of Aguila Point, the eastern point of the entrance, is a reef which breaks and is easily seen.

Directions.—The entrance to the River Romana is too narrow to beat in. On standing in toward the entrance two prominent points will be seen, one on each side of the river. When in line they lead directly on the rock just spoken of. They should therefore be kept just open of each other, bearing about N. 16° W. (N. 16° W. mag.). Steer in on this line, and when inside the mouth of the river keep the western shore aboard. Upon entering the river two small rocks, 6 or 7 feet out of the water, will be seen on the eastern shore a short distance south of the inner salient points just mentioned.

Anchorage.—With the northern of these rocks in one with Aguila Point a vessel may anchor in 5 fathoms of water. The ship should be steadied by a hawser to the rocks. Small vessels of 10 or 11 feet draft may, with the assistance of a pilot, go 2 miles farther up the river, or they may anchor just within the inner western point. Off the eastern inner point there is a bank with only 6 feet of water on it.

Water.—Boats frequently get as far up as the rapids for water. There are no difficulties until coming to a little island where a shelf of rocks runs across, over which there are only 2½ feet, and but one foot near the rapid during its mean level. The river falls over the shelf, so that the boat may almost lie under it, and water very conveniently without landing the casks.

Catalina Island is small and low. The channel between it and Santo Domingo is navigable for large vessels. The Santo Domingo Shore should, however, be kept aboard to avoid a reef which generally breaks off the NW. point of Catalina.

There is a good anchorage in 3½ fathoms of water in the NW. part of a bay, where vessels are well protected by the two prominent points of the island.

Cumayazo River is nearly abreast of the western end of Catalina Island and is said to be broad and deep enough to afford shelter to large vessels. Those drawing 18 feet or more should anchor about 300 yards inside the entrance, in 4 fathoms of water, and a little to the southward of the smaller of two coves on the eastern bank. This berth is near a small dry dock.

Small vessels of 6 or 8 feet draft may take the channel close to the

western bank and ascend the river as high as San Pedro Rock, 1¾ miles from the mouth. Beyond this rock there are three islands. Higher up the river becomes so narrow that it is only navigable for boats to the embarcadero of San Juan, 2 miles above San Pedro.

Water.—A short distance above San Juan good water may be obtained from a basin called Agua Dulce. Boats can not approach it nearer than 200 yards.

Soco River is nearly 10 miles westward of the Cumayazo. Although one of the largest of the rivers flowing south from the Cibao Mountains, it is not navigable except for boats, as a shallow bar obstructs its mouth, inside of which the channel is blocked up by sand-banks covered with drift wood.

Anchorage.—Vessels sometimes anchor about 3 miles off shore in 5 fathoms of water, with the entrance bearing N. 11° E. (N. 11° E. mag.), or N. 23° E. (N. 23° E. mag.), but this anchorage is entirely unprotected. Small vessels lie closer in, in 3 or 4 fathoms, exposed to southerly winds and hardly sheltered to the eastward by Mortero Point.

The landing place is 200 yards inside the mouth of the river, on the western bank.

Santa Cruz del Ceibo lies on the bank of the river of the same name, which is one of the branches of the Soco, about 15 miles from the sea.

Port Macoris is formed by the river of the same name. It will admit vessels drawing 12 feet of water. The entrance is about ½ mile wide between the south point and Point Tibiz, north and west of it. Nearly abreast of the entrance there is a small cay, called Isleta, having a reef extending off its NE. point. On the western side of this cay there is a mud flat, and the channel, with from 15 to 17 feet of water, runs close along the eastern shore. Care must be taken to avoid a small rocky head called Edward Shoal, with 6 feet of water on it, which lies about 100 yards north of the south point.

The mark to clear Edward Shoal is the second cocoanut tree, near the house of the captain of the port, in the village on the eastern bank in one with the north point. After passing Isleta Cay the cocoanut trees should be kept just open till the vessel is within the Edward Shoal, when haul in and anchor just inside the north point.

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Caution.—A sailing vessel can only leave the river with a fresh land breeze, and as the current sets toward the Edward Shoal, care must be taken to avoid it.

Guayacanes Anchorage is 9 miles west of the Macoris River. It an open roadstead. The anchorage is 1½ miles offshore, in 8 or 9 fat oms, with good holding ground. There is a small opening in the re skirting the shore through which boats may reach the landing place.

Juan d'Olio, between Guayacanes and Andres Bay, is also an ope roadstead, and the anchorage is some distance from the land. There a few houses on the shore.

Andres Bay is formed between Caucedo and Magdalena points. The other part of this bay is not safe, but off Agua del Rey, in the inner or eastern part, about 4 miles from Magdalena Point, there is a fair anchorage off the beach in 5 fathoms water, but a heavy swell rolls in. A vessel will lie sheltered as far round as SE., but it is open to the southward. There is another spot in the bay called Playa de Andres, where wood is shipped; but the anchorage is 3 miles from the shore, outside an extensive reef, which forms with the coast a channel with 9 feet water. This place is famed for the prodigious number of pigeons which visit it in May and October, when they may be killed with sticks.

Santo Domingo Bay.—From Caucedo Point the coast trends westward for about 18 miles, and then to the SSW. for about the same distance to Nisao Point, forming the bay of Santo Domingo, which is 25 miles wide and 10 miles deep.

La Caleta is a small bay close to the westward of Caucedo Point, where temporary anchorage will be found in from 3 to 7 fathoms water, sheltered round to SE. Near the point there is an embarking place for mahogany, but large vessels are obliged to load under sail.

Pilots.—Vessels bound to any of the anchorages just described, or those on the eastern coast, generally obtain a pilot at the city of Santo Domingo, which is the port of entry for all these places.

Santo Domingo City and Harbor lies 15 miles from Caucedo Point, at the entrance of the River Ozama, which is barred and shoaling, having about 12 feet over it at low water, with 15 to 22 feet within, almost alongside the banks of the stream, for a distance of more than 3 miles from its mouth. It is readily found by the city, which is built at the entrance, on the right bank of the river; an extensive savannah lies to the westward of it, inclosed by an amphitheater of hills. The city is surrounded by a wall, and defended by a fort at the entrance of the river, with several other outworks and bastions, all in a ruinous state. The city is now the capital of the Dominican Republic.

A large three-storied brewery is in process of erection about 250 yards southwestward from the SW. angle of the cemetery, outside the west wall of the town, and now forms a prominent landmark, being the most conspicuous object in approaching from seaward.

The roadstead can only be considered as a temporary and unsafe anchorage.

The United States is represented by a consul and vice-consul.

Estudios Bank extends about one mile from the shore and is composed of rock with a thin covering of sand and mud, not at all trustworthy holding ground. A vessel lying here in the season of rollers or tidal waves (November to March) or in the hurricane season (July to October) would be very likely to drag her anchors, and in such a case on this rocky shore, where the sea beats with such fury, there would be little chance of saving either ship or crew. With any appearance of bad weather ships lying in this roadstead should immediately seek an offing.

Ozama River.—The outer part of the entrance to the river, between Homenaje Point on the west and Torrecilla Point S. 33° E. (S. 34° E. mag.) of it, is ½ mile in breadth. The latter point is low, rocky, and a bank of from 1½ to 2½ fathoms extends 200 yards to the SW. and in strong breezes the sea breaks heavily on it. Thence the edge of the coast bank, with 1½ fathoms water on it, runs almost in a straight line to the northward as far as the sand spit, above the SE. angle of the fort, and which is low, projects, and contracts the river to about 100 yards in breadth. A little northward of Homenaje Point, in front of a salient angle of the citadel, and near the shore, are several rocks on which the sea breaks.

To Enter the River Ozama a pilot should be taken, and it should be borne in mind that the bar being composed of rocks, a smooth time and high water should be chosen, as a vessel drawing 10 feet would receive serious damage by even touching on the bar. Extensive works are in progress with a view to deepening the water at the entrance. A jetty has been partially constructed on each side of the river which is narrowed at the mouth to 400 or 500 feet.

As the current in the middle of the river is sometimes very strong, a vessel had better moor head and stern close inshore.

The stream out of the River Ozama runs with great velocity.

Tides.—The rise and fall of the tide is about 2 feet, and the time of high water is uncertain. During the rainy season the depth of water on the bar somewhat increases.

Supplies.—Fresh provisions may be obtained. The water used for drinking is kept in reservoirs, as that of the Ozama is salt for several miles up. On the eastern shore of the river there is abundance of good running water, but inconvenient to procure on account of the distance.

Steamers.—There are four regular lines of steamers: French transatlantic line; German line from St. Thomas, Jacmel, Puerto Plata; Spanish line from Puerto Rico, terminating at Havana, and English line from St. Thomas to La Guayra. The Clyde line from New York is the most important, running steamers twice a month.

Coal.—The Clyde Steamship Company has a small quantity of coal here.

Port Dues.—For each ton brought into or taken out of port, $1. Light dues, where there is a lighthouse, one cent per ton register; pilot, if taken, one cent per ton register; for entering port and anchoring, each, one cent per ton register; laydays, 10 cents per day; for interpreter, signal house dues, and physician, each, $4 per steamer; for each hogsh- of water, $1.

Boat Landing.—The landing is at the jetty and abreast of the off of the captain of the port. No charge is made for its use.

Pilots may be obtained on application to the captain of the po They come out to meet all incoming vessels. Their services are r necessary for the outer harbor, neither is pilotage compulsory there.

Lights.—On Fort San José, from a white iron tower, is exhibited a light visible 15 miles. No dependence can be placed on this light after midnight. The light is a revolving red and white alternately, showing a flash every minute; interval between flashes one minute. Reported irregular after midnight, 1891.

A fixed white light visible about 3 miles is also shown from the south extreme of the eastern mole in the Ozama River. Reported inefficient, and to be sometimes extinguished, 1887. (Destroyed, 1892.)

Directions.—Approaching this port it will be useful to remember that a few miles to the eastward of the Cibao Range of mountains two small hillocks rise to a height of 200 or 300 feet above the plain; these make as two islets long before the low shore appears, and if kept on a N. 10° W. (N. 11° W. mag.) bearing will lead a vessel up the anchorage, on nearing which it will be requisite to keep to windward of the port, especially with a fresh breeze, and the lead should be quickly hove as the bank is steep-to. The discolored water from the river may be seen some distance from the land. The vessel should be under easy sail, so as to anchor when the bearings are on. The best holding ground for large vessels will be found in 8 fathoms, sand and mud, with a few houses on the east side of the River Ozama open of the city, and Torrecilla Point, N. 57° E. (N. 56° E. mag.), with the houses shut in, the bottom becomes rocky. Being open to the southward, the sea breeze sends in a heavy, uneasy swell, and the stream from the river causes a vessel to ride broadside to it. It is by no means a safe anchorage.

From the bastion of Don Diego upwards, a vessel can moor at about 75 yards from either bank.

In a sailing vessel it is necessary to have the sea breeze to enter the river, and the land wind to leave it.

Aspect.—To the eastward of the Ozama the plains extend 15 to 20 miles inland; but to the westward, at 4 or 5 miles from the shore, are the first steeps of the southern rise of the Cibao Chain, which runs nearly through the middle of the eastern part of the island, lowers gradually, and terminates near Cape Egaño. The peak of Yaque, the highest part of the chain, rises NW. 59° (N. 60° W. mag.) of the city of Santo Domingo, distant about 66 miles. The difference in the aspect eastward and westward of the river is useful when bound to this anchorage.

The shore eastward of Torrecilla Point is almost entirely composed of rock; there is scarcely a sandy beach to be seen, and the sea generally breaks against it with great violence.

Winds.—During the winter months, and especially in the spring, the land and sea breezes succeed each other with tolerable regularity; but during the remainder of the year they undergo some interruption, particularly in the summer season. Frequently the fresh north winds on the south coast of Santo Domingo completely overcome the sea breeze. Within the Ozama the land wind blows from NNE. to NE.,

and the sea breeze from south to SSW. The first begins soon after sunset, and continues until 8 or 9 in the morning.

Tides and Currents.—Between Beata Point and Saona Island, when the moon's age increases, the ebb tide sets twelve hours eastward and the flood twelve hours westward. The ebb begins at 9 or 10 in the morning and runs at the rate of 1¾ miles an hour. The rise of tide is a little more than 3 feet in Agujero Chico, and 1½ feet at Nisao Point. When the moon's age decreases the waters run invariably to the westward during the 24 hours at from one to 2½ miles an hour. The weather is then changeable, and at times strong squalls are experienced. Off this part of the coast of Santo Domingo, after fresh northerly or southerly winds, the current often sets eastward, and occasionally at other times. The westerly current strikes the coast between Beata Point and the mouth of the Neiva, then turns to the NE. as far as that river, and thence eastward, trending with the coast.

Jaina River is about 5 miles west of Santo Domingo City.

Mahogany is shipped from here, but, as there is no shelter, and bad holding ground, vessels are obliged to lie a long way off shore, and can only receive cargo during calms or northerly winds.

Nigua River.—On its south bank, a short distance from the mouth, is the village of the same name. Although numerous vessels load here, the loading presents many difficulties. The bank of soundings is so narrow that vessels lie close inshore in 12 to 14 fathoms of water. The anchorage is entirely unsheltered, and strong breezes cause the sea to rise 13 to 15 feet above the ordinary level.

Caution.—Vessels can only load during northerly winds, and, indeed, a vessel's safety would be seriously endangered by remaining at anchor off the Nigua River with the wind from any other quarter. The place has the reputation of being very unhealthy.

Najallo River empties into the sea a short distance south of the Nigua River, and the anchorage is equally inconvenient and unsafe.

Port Palenque affords sheltered anchorage, but very confined, with a depth of 23 feet of water over a gravelly bottom. The shore is very steep-to, with 3 fathoms close in shore.

In entering or leaving this anchorage, be careful to avoid a reef which extends SE. and NW. from the weather point.

Nisao Point is low, and descends to the sea by a gentle slope. Off the point is a reef, inside which fishing boats find shelter. From here the coast takes a westerly direction to Salinas Point, which is low and sandy, and may be recognized by the sea breaking over it.

Nisao Roadstead.—To the westward of Point Nisao there is an roadstead where vessels load with mahogany. Here the River N. empties into the sea, and vessels may anchor 1½ or 2 miles off its mc in from 7 to 9 fathoms. The bar is almost impassable, even for bo on account of the rapidity of the stream, and the sea breaks at a tance from shore, making landing difficult.

Water of the river is good at ¼ mile from the mouth.

Port Viejo is an open roadstead. The anchorage is 1½ miles off shore in about 7 fathoms of water. This anchorage and that of Nisao Road lie in a deep bight, between Point Palenque on the east and Point Catalina on the west. The shore is generally bold, and the soundings which are found off some parts to the distance of 2 or 3 miles afford temporary anchorage for vessels visiting this coast for wood. About one mile southward of Catalina Point there is a shoal with only 12 feet water on it, and it is stated that reefs extend off this part of the coast, and which are dangerous, the lead being of no use.

Catalina Bay, westward of Catalina Point, is but little frequented. There is no anchorage in its eastern part. In its western part small vessels only can anchor in 3 fathoms of water.

Sabana Bay affords good anchorage in 5 or 6 fathoms, sheltered by the latter point as far round as ESE.

The roadsteads of Paya, Agua de la Estancia (the port of the village of Bani, 5 miles inland), and Estancia Colorado lie between Sabana and Salinas Bays, and are all open and unprotected. Vessels lie from 2 to 3 miles off shore.

Salinas Bay, between the point of the same name on the west and Palmas Point on the east, has from 15 to 12 fathoms water at 200 yards from the shore. The best anchorage is with a group of palm trees near the eastern point of the bay bearing about N. 85° E. (N. 84° E. mag.) and in line with two hills, also covered with palm trees. Small vessels anchor in 5 fathoms, with a stream cable fast to the shore in case the anchor should drag.

The coast between Salinas and Nisao is fringed with low bush.

The Gulf of Ocoa is open to the southward, and the heavy sea which is caused by the prevailing winds when they blow strong renders the western shore dangerous to approach. The coast of the gulf is bordered by a sand bank, generally narrow, but in places it extends off 1½ miles; the western shore is also skirted by a reef and the eastern shore partly so. At the head of the gulf there are two large bays; the Neiva or Juliana, in the western part, and the Ocoa, which occupies all the northern and eastern shore.

In these bays are various ports and anchorages, some of which are formed by reefs; those in Neiva afford but moderate shelter; those in Ocoa Bay are very good. The hill of Baburuco on the west and the mountain of Busu to the NW. of the gulf, are conspicuous objects. To the eastward of the gulf are the plains or flats of Bani, backed at the distance of 4 or 5 miles inland by the chain of the Cerro Gordo.

The Coast from Salinas Point to Caldera Point is sandy, and free from danger. Half way between the two points the coast projects a little and forms Ranchos Point, which is bordered at 100 yards' distance by a bank of coral and sand with 10 to 12 feet of water on it.

Caldera Bay.—Caldera, the south point of entrance to the bay, is a low tongue of sand and the termination of a flat peninsula of the same name, which is nearly all occupied by a salt lake and partly covered by brushwood and palm trees. The point lies about ½ mile southward of Matasola Point, but the shoals bordering the northern shore contract the breadth of the channel to 300 yards, with depths varying from 4 to 9 fathoms. Banks extend nearly across the bay, from north to south, dividing it into two parts, called the eastern and western anchorages. The eastern anchorage is about ¾ mile in diameter, with from 5 to 7 fathoms of water, diminishing toward the shore, with muddy bottom. This anchorage is perfectly clear after passing the banks which divide it from the western anchorage. These in smooth weather can be easily seen, but with a breeze from SE. or ESE. the sea breaks everywhere, and the channels are not easily distinguished. A stranger should take a pilot.

The western anchorage is only about 500 yards in diameter, with depths of 3½ to 7 fathoms of water over gravelly and sandy bottom.

These two anchorages are sheltered from all winds, but a sailing vessel would be obliged to tow or warp in.

Both of these banks can be easily distinguished from aloft by the discolored water above them. From the western anchorage a depth of 3 fathoms may be carried into the eastern anchorage. For this the eye from aloft will be the best guide.

Water may be obtained from a small spring in the eastern part of the bay.

The Tides in the bay are much affected by the wind. The establishment of the port is uncertain.

Anchorage outside of Caldera Point. The best berth is with Caldera Point bearing S. 78° E. (S. 79° E. mag.) 400 yards distant, in from 11 to 14 fathoms. This is a safe anchorage except during the hurricane months.

Caution.—In approaching Caldera, or any of the ports in the gulf of Ocoa, from the westward, a vessel, after weathering that part of the coast between Beata Island and Avarena Point, should make northing, as the current which runs to the westward near Alta Vela sets to the eastward in approaching the gulf of Ocoa. It is, however, advisable to keep clear of the western shore of the gulf. If bound to Port Caldera work well to windward, but do not stand to the southward of latitude 18° N.

Winds.—The prevailing winds during the day are from east to S and during the night from the westward; but sometimes in 24 hours t blow from all points of the compass. Between the easterly and l winds an interval of calm takes place. The lakes in the vicinity of r port, some of which have been converted into salt ponds, are unheal in the rainy season.

Ocoa Road is in the NE. part of Ocoa Bay. The anchorages are well sheltered from the usual trade wind, but the holding ground, of sand and loose stones, is not good, and anchors easily drag.

The usual anchorage off the entrance of Ocoa River is confined to a narrow ledge of sand, with rocky patches, very steep-to, and so close to the shore that a cable must be carried to the nearest palm trees, keeping an anchor to the westward to check the vessel against the land wind at night, which blows from the west and WNW. The north side of the river is the best. A large number of ships may, however, anchor here in safety. The anchorage should not be approached before the sea breeze is established, at about 10 a. m., and preparation must be made to meet the sudden and violent gusts which rush off the land after passing Ocoa Point, the south extreme of the bay.

Anchorage of Caracoles lies immediately to the northward of Ocoa Road and abreast of the mouth of the River Caracoles. As good a berth as any may be found 1½ miles off shore, with a depth of 5 or 6 fathoms of water. Landing on the beach is not difficult, but with southerly winds a heavy swell sets into the bay.

Azua Bay, into which the River Via empties, is open to the sea, which sets in heavily. While the sea breeze blows, vessels ride very uneasily. Vessels can seldom tow wood to the ships after 11 a. m. There is not room to beat, and vessels are obliged to leave with the land breeze.

There is a reef off the western point of the bay, and near the eastern point the bottom is very uneven.

Tortuguero, the port of Azua, is a fair anchorage.

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The mountains in the neighborhood are covered with trees furnishing a wood of yellow color, fit for cabinet work.

Port Escondido* is about 15 miles to the northwestward of Salinas Point. The entrance to this harbor is ½ mile wide, and its western point is clear and steep-to. The eastern point, lying more to the northward than the western one, is foul to the distance of 200 yards. Half a mile inside the entrance there is a rocky shoal 400 yards long, north and south, and 200 yards wide.

Directions.—In entering the harbor the southwestern shore must be kept aboard, at a distance of 400 yards, to avoid the rocky bank just mentioned, and large vessels should not go farther than ⅛ mile inside the entrance; at ¼ mile inside of this there is a depth of only 2½ fathoms.

Anchorage can be found in 4 or 5 fathoms to the northward of the rocky bank, 600 yards from the entrance, but it is more exposed than the other. Small vessels drawing 13 or 14 feet may proceed farther in;

* This port seems formerly to have been Puerto Viejo Azua. H. O. chart 948 shows only one port. The United States consul at Azua reports much more water, 49 feet, the entrance.

for them Port Escondido is an excellent harbor. Large vessels are exposed to winds from the south or SE., which cause a heavy swell.

Puerto Viejo de Azua is the first anchorage in Ocoa Bay, coming from the westward. It is a short distance north of Martin Garcia Point, and affords excellent and secure shelter to small vessels. Having a depth of only 12 to 15 feet at the entrance, it is inaccessible to large vessels, which may lie outside in good weather in from 3 to 9 fathoms, but this outside anchorage is entirely exposed to the sea breeze.

The entrance to the harbor is quite narrow, and a reef lies off the north point.

In entering, avoid the SE. point, which is distinguished by high and towering rocks. Anchor in 5 fathoms midway between this point and the point of the reef; or having passed the entrance, steer N. 22° W. (N. 23° W. mag.) and anchor in 3 fathoms, the end of the reef bearing S. 22° E. (S. 23° E. mag.).

Tavora or Tabara River lies eastward of Puerto Viejo de Azua, one mile distant.

Rancho del Cuba Anchorage is ½ mile NW. from the white bluffs of Martin Garcia. A good berth will be found, with a depth of 5 fathoms of water, 400 yards off shore and sheltered from the prevailing winds by Point Martin Garcia.

Alejandro Bay.—This anchorage is separated by a point remarkable for its red bluffs from a small cove called Alejandro Bay. This bay is bounded on the west by the mouth of the River Neiva. It affords no good anchorage, and there are several rocks and shoals in it.

Neiva Bay is formed between Points Martin Garcia and Avarena; it is about 8 miles wide and the same distance deep, and open to the SE. The River Neiva empties itself at the head of the bay, about 10 miles westward of Martin Garcia Point; but the bar is only passable to boats.

Barahona Harbor lies on the west side of Neiva Bay. It is a reef harbor, and vessels require a pilot. It is not a suitable place for large vessels. The reef is very steep-to, and at a distance of 800 yards there is no bottom with 118 fathoms, then suddenly the depth decreases to 5 fathoms, shoaling soon after to 10 feet.

The village of Barahona can be seen at a distance of 2 miles, and above it two ranges of hills, one above the other, each range having a saddle bearing S. 68° W. (S. 67° W. mag.) from the village.

Directions.—When approaching from the southward, steer along the reef, which here trends parallel with the coast, until the white houses and church of Barahona bear S. 68° W. (S. 67° W. mag.) Martin Garcia Point N. 68° E. (N. 67° E. mag.). The course is direct for the town.

The opening in the reef is about 800 yards wide in a SW. and direction, the northern reef terminating in a cay of coral and stones feet high, and easily discernible from a distance of 5 miles.

The reef on the SE. side of the entrance must not be approached closely, and the anchorage is just within it.

In order to ship cargo it is necessary to proceed to the inner anchorage, for which a pilot is required, and it may here be mentioned that they merely direct the course, and do not work the vessel.

The inner anchorage is about 200 yards from the beach in 15 feet, mud bottom, good holding ground, and only ENE. winds send in any swell; vessels are moored head and stern, as there is no room to swing.

The land and sea breezes are regular, NW. by night, and SE. to ESE. by day, commencing about 9 or 10 a. m.

Supplies.—Fresh meat can be obtained, but no other supplies can be depended on, except that good water may be brought from the rivulets. No cargo boats can be obtained.

Baburuco Anchorage is a short distance south of Avarena Point; it lies between two reefs, and is dangerous and contracted. Small vessels only can anchor there, with a depth of 12 to 15 fathoms of water 1½ miles from shore.

Mala Pasa Anchorage is easily distinguished by some white cliffs on shore. This anchorage is off the mouth of the River Nisaito, and like the anchorages of Nisaito and Naranjal, a little farther north, is a dangerous place for vessels.

Riocito Anchorage.—The shore is so steep-to here that vessels are obliged to lie in dangerous proximity to it. It is exposed to wind and sea, and, although vessels load here in fine weather, it can by no means be considered a safe anchorage.

Agujero (Petit Trou), 12 miles NE. of Cape Mongon, is extremely difficult to enter, and should not be attempted by any vessel drawing more than 10½ feet, or without the assistance of a pilot. The holding ground is rocky, and not to be trusted. The anchorage is sheltered toward the eastward by a reef 3 miles long, having two cuts in it. The eastern one is 400 yards wide, with several sunken rocks in it, on one of which there are only 10½ feet of water. The western passage has from 18 to 20 feet, but the part of the anchorage to which it leads is strewn with dangerous sunken rocks.

To enter either of these passages, as before said, a vessel should not draw more than 10½ feet, and should be guided by the eye from the bowsprit end. The best time for entering is between 11 a. m. and 1 p. m., when the various dangers may be more easily seen.

Tides.—During the increase of the moon the tides set 12 hours each ay, the ebb to the east and the flood to the west, at the rate of about ne mile an hour. On the decrease there is no ebb at all, and the cur- ent increases to 1¼ knots. The rise and fall is about 3 feet.

Winds.—The sea breeze at Agujero sets in at 2 a. m. and blows till or 8 p. m., when it veers to east and E. by S. till near midnight. here is consequently little or no land wind. The River Agujero npties into the harbor.

All this part of the coast abounds in game.

Caution.—This place is stated to be entirely exposed to the sea, and such a heavy surf is thrown on the beach that for days, and occasionally for weeks, it is impossible for a boat to effect a landing, much less bring off a cargo.

Cape Mongon is a high promontory, which from a distance of 15 or 18 miles appears like an island. In the interior will be seen the lofty mountains of Baburuco, which rise to the height of 2,400 feet.

Beata Point is the southern extreme of Haiti, and terminates to the south in two salient points forming a small bay. This part of the coast presents a white rocky abrupt plateau, about 40 feet high, in which are large gaps and crevices. On one of the points there is a small hillock. The south point of Haiti has, 2 miles NE. of its extremity, a rocky coin-shaped hillock, which, seen from a distance of 10 miles on a northeasterly bearing, has the appearance of an island, and then much resembles Alta Vela. The SW. part of the point is long, low, and cliffy; off its extremity is a small rock. The small bay between the points does not afford shelter from the prevailing winds; its shore appears steep-to, with very little beach. The rocks and cliffs in the bay are much whiter than those to the NE. of Beata Point. For 4 or 5 miles to the northward of the point, the coast, viewed either from the east or west appears as a low promontory extending from the foot of the Baburuco Mountains, and rising in the center to a height of 80 or 90 feet; the surface is covered with a low, thick scrub. The coast line to the NE. is of dark, low cliffs.

Bank of Soundings.—Between Points Beata and Espada the coast is little known; it is bordered by a narrow bank, and the anchorages are generally dangerous, especially during the winter months, when the wind inclines to the southward; generally, too, the winds are strong with almost always a heavy sea.

Between Beata Point and Cape Tiburon the coast is bordered by a narrow bank of soundings. From Cape False to Sale Trou, the bank varies in distance from one to 3 miles from the land; between Sale Trou and Aquin it extends off from ½ to one mile. For a space of 20 miles westward of Cape Jacmel, the bank is interrupted, and in this space there is no bottom, with upwards of 90 fathoms at from 200 to 400 yards from shore.

Currents.—Along the south coast, between Cape False and bay of Cayes, the current near the land runs to the eastward, and often sufficiently strong to assist a vessel to windward; but southward of Beata Point it runs strong to the westward. Near the land between Be[illegible] Point and the island of Saona the current also sets eastward.

Beata Island is about 5 miles long north and south, 2 miles bro[illegible] mostly covered with brushwood, and from 50 to 80 feet high. [illegible] southern part is the most elevated. The south coast is about 40 or [illegible] feet high, steep and rocky. The SW. point is of a similar bold nat[illegible]

but is lower. The north end terminates in a long, low point, and not far from it there is a solitary hut. The west side is bold and steep-to, and off some parts of this side there is no bottom with 130 fathoms of line, at ¾ mile from the shore; and off others a depth of 20 fathoms, nearly a mile distant. From the SW. point a ledge stretches off some distance in that direction; discolored water extends WSW. of this point a distance of 2 miles. The east side is very steep; it extends NE. and SW., rising towards the south. The SE. point is a steep bluff having some small rocks off it, but the north and NE. sides are connected to Beata Point by a shallow white bank, on which the greatest depth is reported to be 3 fathoms. N. 11° E. (N. 10° E. mag.) of the island there is a breaker. To the northward and westward of Beata are five small rocky islets.

Anchorage.—Good anchorage will be found in from 7 to 9 fathoms water, at about ½ mile from the shore, with the north point of the island N. 71° E. (N. 70° E. mag.), and Alta Vela, S. 35° W. (S. 34° W. mag.).

Alta Vela (the high sail) lies SW. of the SW. part Beata Island. It is ¾ mile long and ½ mile wide, and is almost entirely composed of a remarkable bell-shaped hill, the summit of which is 500 feet above the sea. At ¾ mile north from the north side there is a small low flat black rock about 100 yards in length and 20 feet high; and a coral bank of soundings varying from 15 to 18 fathoms stretches off 1½ miles from the SE. and about one mile from the SW. side. The shores are rocky, but may be approached with safety. There is anchorage in from 7 to 11 fathoms, coral, off the wharf at the NW. side of the island, with the flagstaff bearing about N. 80° E. (N. 79° E. mag.) distant nearly ½ mile. The veins of phosphate of lime and alumina on the island are being worked by a company. Vessels bound either east or west will find Alta Vela a most valuable point of departure.

NOTE.—The relative positions of these islands with regard to each other and Beata Point are reported to be erroneously shown on the charts. Alta Vela is said to be S. 49° W. (S. 48° W. mag.) 5 miles from the center of Beata Island, while the eastern side of Beata bears S. 1° E. (S. 2° E. mag.) of Beata Point.

Beata Channels.—There is a heavy swell and variable current in the channel between Beata Island and the mainland, and the depth is somewhat less than 3 fathoms.

The channel between Alta Vela and Beata Island is quite clear, but the currents are strong and irregular, and it will, therefore, be more prudent to pass to the southward, on which side it may be approached within 1½ miles.

Fraile Rock lies N. 19° W. (N. 20° W. mag.) of Alta Vela and westward 8 miles from the north end of Beata Island. It is about 100 yards in extent and 50 feet high, and at a distance has the appearance of a cluster of sharp peaked, rugged rocks, with white tops. It is steep-to, having 17 fathoms at 200 yards off.

Coast.—From Beata Point, and as far as Cape Rojo, the coast is formed by vertical bluffs, which give a peculiar character to the small bays along the shore. These bays lie between the points of the cliffs, and are bordered by a narrow sand beach, from which it is necessary to climb the bluffs or seek a ravine in them if it is desired to go farther inland. The coves or small bays of Rousselle, Aguilas, Thomas, Burgados, Truyes, and Vases, afford examples of this singular conformation, particularly remarkable immediately to the westward of Beata Point. The old descriptions of the coast of Santo Domingo give the name of *acculs* to the bays of this description. From the shores of the bays the summit of the cliffs is frequently very difficult of access.

Between Beata Point and Cape False there are three small bays, only affording suitable anchorage for small vessels in 8 to 11 feet of water. East of Burgados or Agujero Azul Bay, the western of the three, a white sand bank commences, which, bordering the coast to Beata Point, connects it with Beata Island by a narrow ridge, on which there are from $2\frac{1}{2}$ to $2\frac{3}{4}$ fathoms of water.

Cape False, 135 feet high, is the extremity of a long headland running east and west, and lies 8 miles south of Cape Rojo.

Thomas Bay.—Anchorage, sheltered from south and southwesterly winds, may be found in the middle of this bay, in from $5\frac{1}{2}$ to 8 fathoms of water, which diminishes gradually to the shore at the foot of the high cliffs, which entirely surround it.

Aguilas Bay is skirted by a beach of coarse sand and gravel, with steep bluffs behind it. The depth varies from 12 to 8 fathoms, diminishing to $2\frac{1}{2}$ fathoms as the beach is approached. Good anchorage is found here, unsheltered, however, from westerly winds. A good berth is half way between the two points and a little within a line drawn between them, in $7\frac{1}{2}$ or 8 fathoms. This bay is separated from Rousselle Bay by a cliff two miles in length, called Agujas.

Rousselle Bay is like the bay just described, a beach of sand and gravel at the base of high cliffs. Vessels may anchor $1\frac{1}{2}$ miles off shore, in 8 to 11 fathoms of water, sheltered from north round by east to south. A river by the same name runs into the bay.

Cape Rojo.—To the northward of Rousselle Bay is a cliff 40 feet high and two miles long, called Trou Jacob Cliff, the northern extremity of which is Cape Rojo.

Trou Jacob Bay is between Cape Rojo on the south and Platform Point on the north, into which empties the river of the same name. Anchorage sheltered from the usual winds may be found in this bay in from 3 to 7 fathoms, with a bottom of coral or sand, with Cape F bearing S. 35° E. (S. 36° E. mag.) E. or S. 22° E. (S. 23° E. mag.) miles distant.

Platform Point is a moderately high bluff with a flat top. To northward and between it and Pedernales Point, or Pitre, are bays also called Pedernales or Pitre. The river of the same na which empties into the northern bay, is a considerable stre

forms in part the boundary between the republics of Haiti and Santo Domingo.

Anchorage may be found abreast the lowland of the northern bay or to the southward of the western point of the mouth of the river. The anchorage is easy of access and without danger. The coast in this neighborhood is formed of chalky cliffs with a few gravelly beaches.

Coast.—From Pedernales Point the coast takes a NW. direction to the village of Sale Trou; between are the small bays of Piéges, Raccroc, Cochon, Grand-Gosiers, and Boeuf.

A remarkable range of red rocks 3 miles long lies immediately NW. of Pedernales Point, terminating at Piéges Point, the southern limit of the little bay of the same name. This point may be known by a remarkable white triangular cliff, 220 feet high. Off the point at ½ mile southward of the white triangular cliff, and about ¼ mile from the shore, lies a ledge of rocks above water.

All the coast here is formed by white cliffs above a stony beach; soundings extend off for two miles.

The Anchorage of Sale Trou is limited to the westward by Boca Chica Point, formed of high white cliffs which extend for 3 miles to the westward. Behind these cliffs the land rises rapidly to the mountains of La Hotte. On the east the anchorage is bounded by Predicador Point, a low point to the eastward of which, ½ mile distant, is a small islet near the coast, not easily distinguished.

In the NW. angle of the bay is the village of the same name. There is a beach of coarse gravel, terminated by a red bluff called Tapion, easily distinguished from a distance. Half a mile to the eastward of this cliff the River Sale Trou empties into the bay. Small vessels may anchor abreast of the village with from 17 to 20 feet of water, sand, and mud. Large vessels must anchor one mile off shore in 7 or 8 fathoms, but the holding ground is not so good. The anchorage is entirely open to the southward and is dangerous during the summer months.

River Salée Bay.—Farther westward is River Salée Bay, the western point of which is broad, round, cliffy, and commanded by a conical hill. At the head of the bay a river empties itself on a shore of sand and pebbles.

Morne Rouge is 17 miles eastward of Cape Marechaux, the eastern point of Jacmel Harbor; it may be recognized by several high white cliffs 4 miles in extent, having at their west end a remarkable square red cliff; it is also known by two hummocks on it. The shore is all along o steep, and in some places foul, that with light baffling winds, which re generally accompanied by a heavy swell, sailing vessels had better ive it a wide berth.

Orange and Coutelas Bays.—Immediately eastward of Morne Rouge is Orange Bay, which terminates to the east at the point of the same name, formed by high white cliffs. There is no beach in this bay, but small islet lies in the middle of it, named Patira.

Between Orange Point and Colombier Point, near which is a large rock of the same name, is the bay of Coutelas. It is 3 miles in breadth and surrounded by high cliffs.

Cayes Jacmel.—The anchorage of Cayes Jacmel, at 2 miles eastward of the village of the same name, affords but little shelter and is fit only for coasting vessels. The village of Cayes Jacmel stands near the shore at a mile eastward of Belle Roche Point, and on the right bank of a small river of the same name. The anchorage extends 2 miles east and west and nearly ¾ mile in breadth. The reefs and sand banks are easily seen when the sun will admit. The entrance is open to the southward, and ½ mile in breadth between the reefs and white sand banks which border the interior. Having entered, steer westward and anchor eastward of the village. To the eastward or westward there is some shelter from the sea from the southward, which is generally very heavy. There are several sandy beaches on the shore.

Banique Bay.—From Marigot Point a reef skirts the shore at 1½ miles off as far westward as Fournier Point, a distance of 10 miles. There are several openings in the reef through which small vessels can pass. The principal one leads into Sauzay Bay, formed between Belle Roche and Fournier Points, and in front of which is a small islet. To the westward of Fournier Point is Banique Bay, at the head of which Normands Rivulet empties. Soye Point to the westward terminates in cliffs, and between it and Cape Marechaux, 4 miles westward of it, the coast is composed of high cliffs; between them are the small bays of Fontaine and Arnaud.

Jacmel Bay, between Capes Marechaux and Jacmel, about 2 miles apart, is 2 miles deep and open to the SE. The former cape is a long flat strip of table-land about 1½ miles in extent, terminating in a bold bluff about one hundred feet high, and steep-to. At the distance of one mile from it there is no bottom with 150 fathoms. Just inside of Cape Jacmel is the Bay Baquette, but the water in it is very deep except quite close to the shore.

The town of Jacmel stands in the NE. corner of the bay on the east side of the Grande River, which forces itself through several openings in the sandy beach at the head of the bay; a dry spit of sand and shingle, about 400 yards long, has formed across the mouths of the river, the water of which finds an outlet round the west end of the spit; on the western side of the bay are two remarkable white cliffs. In the center of the bay no bottom will be found with 80 fathoms, and the narrow strip of soundings which skirt the shore at the distance of from ¼ to ½ mile is steep-to. At ¼ mile southward of the town a shallow rock half flat runs off nearly ½ mile.

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Directions.—From the offing to the eastward of Jacmel an excellent landmark for its locality is a deep cut in the mountain range back Cape Marechaux. Should this notch be hidden by clouds, as it f

quently is, Belle Roche Point, off which there is a white rock of the same name, which, being overgrown with bushes in the center, appears like two rocks, will be a good guide toward the bay.

As the bank of soundings where anchorage is practicable is very steep-to, the ship should be under easy sale or steam, ready to anchor at once on striking soundings. Steamers calling here for the mails only, frequently remain underweigh and do not anchor.

The anchorage space is limited and it is always necessary to lay out a kedge to avoid fouling when the land wind comes off. A small pier or boat jetty has been built close to, westward of the wharf.

To approach the anchorage bring the cathedral to bear N. 19° E. (N. 17° E. mag.), when northward of Baquette Bay, and steer for it on that bearing. The flagstaff is on the western side of the cathedral. The breakwater is in ruins.

Steamers.—The steamers of the West India (Atlas) Mail Company call here twice a month. The French Transatlantic line and a German line also call, as well as the Royal Mail Steam Packet Company and the Dutch line.

Supplies.—Coal can not be depended upon, but other supplies are plentiful. Good water can be obtained at the wharf.

Land and Sea Breezes are generally very regular in Jacmel Bay. A heavy swell rolls into the bay, and care must be taken to avoid being becalmed near the shore. With a land breeze this may be avoided by keeping the valley open. Tide rises about 3 feet.

Pilots are very slow to board vessels, and their services are not necessary. The plan of the bay may be somewhat incorrect, as the banks are said to have undergone considerable change.

Pilotage.—Inwards, if taken at Baquette Bay for vessels of from 50 to 100 tons, $4; 101 to 200 tons, $8; 201 to 300 tons, $10; 301 to 400 tons, $12; over 400 tons, $16. If taken in Baquette Bay half of these rates. Outwards, half the stated rates are charged.

Dues.—The tonnage dues are about $2 per ton. The weight in use is the old French pound livre.

There are no interpreter's fees, although a gratuity of from $5 to $10 is generally given.

Anchorage Dues.—Vessels entering and leaving port again within twenty-four hours pay $25 (Spanish dollars); for the right of proceeding to a second port in Haiti; vessels under 150 tons pay $200; above 150 tons and below 200, $250; above 200 tons, $300 (Haitian currency).

Cape Baienet may be readily distinguished by the white hillocks which overlook the cliffs that form the shore, and is the south point of a small bay of that name, at the head of which there is a little village. The bay is quite exposed to the east; there is no regular landing, and a heavy sea sets in on the beach.

From Cape Jacmel to this cape the shore trends westward 10 miles; there are several small bays between, but no shelter whatever.

A conspicuous white rock lies about 2 miles west of Cape Jacmel, and is an excellent distinguishing mark when approaching Jacmel Bay from the southward.

Morne Rouge Point, about 40 miles westward of Cape Baienet, is of considerable elevation, and at some distance off appears a bold headland, but as it is approached it becomes known by five remarkable white hummocks near its extremity. The mountains near it rise to the height of about 1,000 feet. In a small bay on the east side of the point there is a small rock called the False Diamond. At a short distance from the point there are 10 and 11 fathoms water.

East Flamand Bay.—To the eastward of Morne Rouge Point is East Flamand Bay, formed between it and Flamand Point on the east; it is open to the southward and affords no shelter. From Flamand Point a reef extends a mile to the southward, and on its west side there is a shelter from easterly winds for small vessels. In this bay there are 7 to 11 fathoms water, shoaling gradually to the shore.

Coast.—All the projecting points and headlands on this part of the island are bold and steep-to. The white cliffs and hills resembling chalk are very remarkable; the easternmost, and most elevated, called the hummocks of Aquin, form the Morne Rouge Point, and can not be mistaken. From the latter point to Cape Baienet the shore is straight, bold and steep-to, so as to receive the name of the Iron Coast. It affords no shelter whatever against the sea breeze, and the edge of soundings is about 1½ miles off the coast. About 6 miles westward of Cape Baienet there are some high cliffs, and near them a small rocky islet. In the above space are several small bays, but they are of no importance.

Aquin and English Bays are partially protected to the southward by a chain of reefs and cays lying from one to 3 miles offshore, with clear channels leading into the bay between most of them.

In Aquin Bay there is secure anchorage for vessels of light draft in 3½ and 4 fathoms of water. In English Bay the water is deeper and the holding ground is good, but the anchorage is not so well sheltered.

Grosse or Aquin Cay can be recognized by two remarkable white hills, from 300 to 500 feet high, and four white cliffs on its southern side. It is bold and steep-to on all sides.

Diamond Cay is a small, white, rocky islet nearly in the middle of the eastern channel into Aquin Bay. The rock is bold on all sides except the north, whence a long, narrow ledge runs off.

Ramier or Pigeon Cay is narrow and about ¾ mile long east and west. There are on its south side three sand cliffs 25 feet high. A small cay lies ¼ mile from its west end, connected to it by a beach of sand and coral, from the west side of which a reef extends for nearly ½ mile with 5 fathoms water at its outer edge.

Kansas Reefs, a coral patch with from 4 feet to 5 fathoms water on it, lies S. 55° W. (S. 53° W. mag.), 1 3/10 miles from the east end of Ram

Cay; it is about ½ mile in extent, and generally breaks with 9 and 10 fathoms close to its edge. About ¾ mile N. 43° W. (N. 45° W. mag.), of this shoal is a small coral head, with only 2 fathoms on it and deep water all round.

Breakers and shoal patches with from 4 to 5 fathoms on them are shown as lying east 1¼ miles, S. 43° E. (S. 45° E. mag.), 1½ miles, and N. 80° E. (N. 78° E. mag.) ¾ mile from Kansas Reefs.

Regalle Cay is a small bushy islet surrounded by a sand bank to the distance of about 200 yards; one mile N. 9° W. (N. 11° W. mag.) of Regalle Cay is a small islet just above the level of the sea, called Anguille or Eel Cay.

NOTE.—The relative positions of Ramier Cay, Anguille Cay, and north side of Grosse Cay are not accurately known.

Channels.—The channels leading between the cays into English and Aquin Bays are deep and clear. That between Morne Rouge Point and Diamond Cay is not to be recommended for a sailing vessel, as the wind is apt to be baffling under Morne Rouge, and the ledge north of the Diamond is to leeward. The channel between Diamond and Grosse Cays is to be preferred. The channel between Grosse Cay on the east and Regalle and Anguille Cays on the west is clear and good. The passage between Ramier and Anguille Cays is to be avoided, as it leads too near the Kansas Reef. Between Ramier and Regalle Cays vessels drawing more than 10 feet should not pass, on account of a ridge of rocks extending to the westward of the latter islet. Between Cape St. George and Ramier Cay the channel is free of danger, but care must be taken to keep clear of the ledge west of Ramier Cay. Entering the bay by any of these channels the best anchorage will be found on the north side of Grosse Cay, in 5 or 5½ fathoms of water, keeping closer to the cay than to the Haitian Shore, on account of a bank with 9 feet of water on it, which makes out ½ mile to the southward from the main land, taking care not to get south of a line joining the two points of the northern side of Grosse Cay to avoid Dryad Shoal.

St. Louis Bay is open to the south, but to the SE. it is protected by some small cays; the two outermost and largest of these, called Mosquito and Orange, lie about a mile from the shore and are ¾ mile apart. On the west end of Orange Cay are two remarkable hillocks, 40 and 80 feet high, which are seen from the town of Cayes just clear of the intermediate points. Within them are the small Cays of Rat and Taigneuse, and close to the shore, at ¾ mile eastward of Bonita Point, is Henri .et.

The town of St. Louis stands in the NE. corner of the bay, and about nile SW. of it there is a large rock, on which stands Fort St. Louis; d about ¼ mile to the NW. of St. Louis, on a low point, is another :t.

Directions.—In entering, keep Pascal Point, on the western shore, ɔse aboard to avoid a sand bank lying off it, nearly in mid-channel.

Having cleared this, stand up the bay, and a good berth will be found in 7 fathoms of water, 600 yards west of the old fort of St. Louis. Small vessels may pass to the northward of the fort for an inshore berth.

In case of necessity a vessel may enter St. Louis Bay by passing in NE. of Mosquito Cay and close to the northward of Rat Cay, between the latter and Taigneuse Cay. The channel is narrow, however, and there are said to be several shoals between Rat Island and Bonita Point.

The winds from March to September are from SE.; from September to March from ENE. Near the coast, to the west of St. Louis, the wind is NE. or east, while at the same time north of Cape Tiburon it blows from SE.

Little Meste Bay, westward of St. Louis Bay, is merely a small inlet, about ¼ mile wide and a mile deep; it is open to the southward, has good holding ground in from 4 to 6 fathoms water, and the shores are bold.

Great Meste Bay, 2 miles westward of Little Meste Bay, is ¾ mile wide in the narrowest part and 2 miles deep; it is capable of receiving vessels of the heaviest draft, there being 5 and 6 fathoms water at its inner part; the holding ground is good, but it is open to the southward. Nearly in front of the entrance, however, and about 1½ miles from the shore, is the Mella Bank. It is necessary to pass round the east or west end of the bank to enter the bay.

The eastern entrance to the bay is about ¾ mile wide and lies between the Almacenes Cays, near the west side of entrance to Little Meste Bay, and the east end of the bank south of them. The western entrance is ½ mile wide, and formed between Toulan Point and the west end of the bank south of it. To enter by the western passage, the coast between Paulino Point (½ mile eastward of Toulan Point) and St. Rom Point, at the west side of entrance to the bay, should be kept aboard; then keep mid-channel into the bay. The soundings diminish gradually from 13 to 1¼ fathoms water near the mouth of the river at the head of the bay.

Mella Bank, to the northward of the cays and sand banks which border the north coast of Vache Island, consists of four shoals lying between the meridian of Toulan Point (the eastern point of the entrance to Flamand Bay) and that of Boyet Point (the eastern point of the entrance to Great Meste Bay). They are all of small extent, steep-to, and when the sun is shining brightly may be seen from aloft. It is probable that the bank is still changing. The outer shoal is about 1¼ miles from the shore.

The western shoal has a depth of 12 feet and lies S. 32° E. (S. 34° mag.) about a mile from Toulan Point.

The other three shoals lie within ¾ mile of each other. The mid and largest is nearly circular, about ¼ mile in diameter, has 6 feet its shoalest part, and bears from Boyet Point S. 19° W. (S. 17° W. ma 1¼ miles distant. The remaining two, with 12 feet water, bear N. 6

E. (N. 67° E. mag.) and N. 37° W. (N. 39° W. mag.) 600 yards from the largest shoal.

By keeping 1½ miles off shore a vessel will pass in 7 fathoms clear of all dangers, no shoals or rocks having been found south of this limit. Passing ½ mile outside the line of the headlands will lead through the channel between Mella Bank and the main, but in using this channel the lead should be kept constantly going, as the soundings are very irregular.

Flamand Bay is a narrow inlet 2½ miles in length and nearly ½ mile in breadth. The south side of Carenero Islet is foul to the distance of 600 yards, and the east side of the entrance from Toulan Point to the inner point, a mile northward of it, should not be approached within 200 yards. The inner point is also foul on its north side, and between it and the opposite shore the channel is not more than ¼ mile wide. Within this the depth gradually decreases from 4½ to 2 fathoms, towards the head of the inlet, the bottom is everywhere mud, and the inner part is so well sheltered that small vessels moor in it during the hurricane season.

As this inlet runs so far in, the temperature is very high and the musquitoes are unbearable until the end of September. The tide rises about 3 feet.

Trou de Forban is on the western shore close to the little village of Renon. It is a completely sheltered cove, with from 1½ to 2 fathoms of water, called the Trou de Forban.

On going to sea from Flamand Bay vessels pass to the westward of Vache Island and generally take a pilot, upon whom, however, but little dependence can be placed, and a vigilant lookout will be necessary.

Caballon Bay lies between Carenero Islet and Caballon Cliffs. Nearly in the center of the entrance of the bay there is a shoal with 2¼ fathoms on it, and which extends 600 yards NE. and SW., and about 200 yards in breadth; it may be passed on either side. The west side of the bay is steep and rocky; the best anchorage is on the east side, close up under the mangrove trees, where the depth of 5 fathoms will be found almost touching the shore, Carenero Islet sheltering it from the SE. Water may be obtained some little distance up the River Caballon, that flows into the bay.

Bay of Cayes terminates to the NE. in the Manchon de Caballon, and to the southward by the island of Vache; the Manchon de Caballon is the west part of the bay of the same name and lies 7 miles to the north of the NW. point of Vache Island, and about 3 miles NE. of the town. It is composed of three remarkable white cliffs at the extremity of a hill, which separates two deep ravines on the west side of Caballon Bay. About midway between Cayes and the cliffs is the small wooded islet of Compañia, now connected with the main part of the island by a dry reef.

The towns of Aux Cayes and Jacmel are next to that of Cape Haiti in

commercial and political importance. The sailing vessels come chiefly from the United States. All European trade is performed by steamers.

Aux Cayes has a population of 10,000 inhabitants.

The United States is represented by a consular agent.

Steamers.—The Atlas line of steamers from New York, Diamond line from Boston once a month. French and German lines call here.

Port Charges.—Pilotage, $5 inwards and outwards; health visits, $5; tonnage dues, $1 per ton register; stevedores, 20 cents per ton stowing cargo; bill of health, $1.

Coast.—From the town the coast takes a SW. direction for about 7 miles and then bends around to the SE. and southward for 7 or 8 miles to Abacou Point, forming the bay of Cayes. All this part of the coast is very low, but backed at a short distance by lofty mountains. To the northward of Abacou Point the shore is bordered by a reef which extends off some distance, and several small cays and rocks lie off it; they are named Carenage, Bœuf Islet, etc. Nearly midway between Aux Cayes and the River Acul is the village of Torbec, 1½ miles NE. of which is the village of Vieux Bourg, off which is the road of Chateaudin.

Great Reef is an extensive white sand bank southward of Aux Cayes, upon which at the NW. and SE. parts are two heads of coral partly uncovered. These banks, extending from abreast Aux Cayes to nearly halfway towards the island of Vache, and along the shore for one mile SW. of Torbec, shelter the anchorages of Chateaudin. A ledge extends from Great Reef to the NW. point of Vache Island, the depths on which are 2½ to 5 fathoms.

Chateaudin Anchorage.—The inner anchorage of Aux Cayes is very limited, has only about 13 feet water, and difficult to enter or leave. That of Chateaudin is separated from it by a narrow tongue of white sand, which leaves the shore and joins the northern part of the Great Reef; small vessels pass over it from one anchorage to the other. The Chateaudin Anchorage is well sheltered and extends from Principe Point, west of the village of Torbec, as far as Chateaudin Point. The soundings diminish regularly from 4½ fathoms at its southern part to 2¾ fathoms near the tongue of sand separating the two anchorages, and as the shore or reef is approached.

The entrance to Chateaudin Road, between the west end of Great Reef and Maho Point, is about ½ mile in breadth and carries 15 feet water. Vessels anchor in about 17 feet, sand and mud, at ½ mile from the shore off the village of Torbec or that of Vieux Bourg. Those of large tonnage anchor in 7 or 8 fathoms southward of Compañia Isl In all these anchorages wood, water, bread, fresh meat, and vegetab are easily obtained at reasonable prices.

Caution.—The various charts of the bay of Cayes differ very mu and the hydrography of this vicinity, like that of the greater part the coast of Haiti, is exceedingly defective.

Etron du Porc.—In the middle of Cayes Bay, and nearly midway between the NW. point of Vache Island and the western shore of the bay, is a dangerous small rocky shoal, awash, called Etron du Porc. This shoal has 4 fathoms water close to. Vessels should pass eastward of it.

Pilots.—As Cayes Bay is not well known, a stranger should have the assistance of a pilot, but as the pilots are not well acquainted with the locality, too much confidence should not be placed in them. The signal should be made as soon as possible, and if necessary a vessel can anchor northward of Diamond Point at the west end of Vache Island.

The Winds in Cayes Bay are pretty regular. The land wind comes off from the NW. and veers round gradually to the NE. until about noon, when the sea breeze sets in from the SE. and veers to the south towards evening.

Directions.—The anchorages in Cayes Bay may be approached by the channel eastward of Vache Island, or by that between the island and Abacou Point. In taking the latter channel, run down the south and west sides of Vache Island. The soundings between Lataniers and Diamond Points are irregular, and in proceeding to the anchorages off the NW. part of Vache Island, it will be prudent to keep at least 1½ miles off shore, giving Point Lataniers a good berth, and not coming into less than 5 fathoms until abreast the NW. point; then haul up eastward of Great Reef, which should be seen on the port bow and a wide berth given to it, avoiding also the shoal patches in the channel.

The Island of Vache is separated from Abacou Point by a channel 3 miles wide, with irregular soundings. The island is about 8 miles in length and about 2 miles in breadth. Its eastern part is low and thickly wooded; the western portion is composed of small detached hills about 100 feet high, partially cleared of wood, and at the distance of 10 or 12 miles they have the appearance of several small islets. From the east point the south shore runs nearly straight, and is skirted by a reef at the distance of from ¼ to nearly ½ mile. Along the eastern portion of the island the soundings are from 4 to 8 fathoms within ¼ mile of the reef; but from the middle of the island to the westward the water is shallow, and 3 and 3½ fathoms will be carried along at about ½ mile from the shore. There are 6 and 7 fathoms water at a mile south of the Diamond Rock, whence it decreases to the shore; the shallow ground will generally be seen.

Lataniers Point, the SW. extreme of Vache Island, is low and thickly wooded. Shoal water extends a considerable distance to the SW. of the point.

Diamond Islet is not easily distinguished, being of the same color as Diamond Point, from which it is only distant 20 feet, and is not easily recognized more than one mile distant.

Diamond Point is the central one of three detached white cliffs in the northwestern part of Vache Island.

Agua Bay.—Between Diamond Point and the NW. point of Vache Island there are two coves, the northern of which is called Agua Bay.

Temporary anchorage may be found about one mile off this part of the island in 5 or 5½ fathoms of water, sandy bottom.

Feret Bay is about ¾ mile eastward of the NW. point of Vache Island, and at its eastern point of entrance is the high white islet of Raquette, connected to it by a reef. The bay is small. Small vessels in entering the bay should keep midway between the points, and anchor in the middle of the bay, avoiding the white sand bank with 1¼ fathoms on it, easily seen, and which borders the salient points of the bay.

Islets and Reefs.—From Raquette Islet eastwards, the north coast of the island is bordered by a white sand bank with several cays and reefs. The bank extends off about ½ mile as far as Rochers Point; thence the edge curves to the northward, westward of West Cay which is covered with trees and 1¼ miles NE. of Raquette Islet; then round a group of islets, the most northern of which is named Great Cay à l'Eau, covered with thick and bushy trees, and more than 3 miles from Vache. The cays of this group lie close together, and when bearing N. 66° W. (N. 68° W. mag.) appear as one; it then trends in the direction of East Cay, situated just within the edge of the reef, N. 18° W. (N. 20° W. mag.) 4 miles (approximately) from the east point of Vache Island. The cay is small and low, but well marked by a grove of cocoanut trees and some fishermen's huts.

About a mile S. 21° E. (S. 23° E. mag.) of East Cay is a small sand bank 5 or 6 feet above water, situated also just inside the edge of the reef.

Within the cays, and between the reefs and coral heads, there are navigable veins of deep water, which afford anchorage for small vessels. In coming from the eastward for these anchorages keep to the northward of the cays, and on no account should they be taken without a pilot.

In passing to the eastward of Vache Island it is necessary to keep at a distance of 2 miles from the island and the same distance from the reef, which is steep-to, no anchorage near, and the current set towards it. The mariner should avoid being becalmed in its vicinity.

East Reef.—The edge of this reef, extending from the east point of Vache Island round the adjacent cays, East and Great Cay a l'Eau to the NW., is tolerably well defined by an almost constant break ripple, as also by several small rocks above water. By day the r may be approached with safety, provided a good lookout be kept, b at night the utmost caution is requisite.

Tides.—The ebb stream sets strongly to the southeastward over shoals northward of Vache Island.

Western Channel to Cayes.—The western channel to Aux Cayes through the bay of Cayes and between the NW. part of Vache Island and Great Reef is not used by large vessels. Shoals other than these shown on the plan are reported to have grown up, and the water generally to have shoaled. Several steamers having grounded, this route is only used now by small vessels. The eastern channel is generally preferred.

Route from the Eastward.—Approaching Cayes Bay from the eastward, close the coast near Morne Rouge Point (which may be known by five white cliffs) and steer along the land, southward of the small outlying cays, and northward of those extending off Vache Island. From a position about one mile northward of Grande Cay á l'Eau, steer N. 65° W. (N. 67° W. mag.) for Compañia Island, until Tourterelle Battery bears west (S. 88° W. mag.), when alter course to pass midway between this battery and a battery at the entrance of Riviere l'Ilet. When the SE. extreme of Compañia is nearly in line with white cliffs to the northward, bring the SE. extreme of Compañia in line with the center of eastern white cliff, about N. 50° E. (N. 48° E. mag.), which mark kept on astern leads direct to the anchorage for large vessels, which will be reached when Tourterelle bears north (N. 2° W. mag.). Small vessels may anchor farther in. The above route carries a least depth of 6 fathoms.

Vessels from the westward, after passing Lataniers Point, should keep one mile from the south side of Vache Island, in which route no bottom at 10 fathoms will be found. Round the east point of Vache Island at 1½ miles distant, and when it bears N. 88° W. (west mag.), steer N. 2° E. (north mag.) for Orange Cay. When the north point of Great Cay a l'Eau comes in line with East Cay, bearing N. 66° W. (N. 68° W. mag.), alter course to N. 21° W. (N. 23° W. mag.), keeping some white cliffs in little Meste Bay on starboard bow; continue this course until East Cay comes in line with the NW. extreme of Vache Island S. 81° W. (S. 79° W. mag.), then alter course N. 66° W. (N. 68° W. mag.) and proceed in as above directed.

If from the southward, steer 2 or 3 miles eastward of Vache Island, and bear in mind that the current sets strong towards it and the eastern reefs.

In proceeding to the eastward from Cayes Anchorage, steer S. 76° E. (S. 78° E. mag.), and when East Cay bears S. 2° W. (south mag.), a course to the southward and eastward may be shaped.

Caution.—Several shoal heads have been reported in Cayes Anchorage. H. M. S. Druid passed close to and over some dark patches, and, with the exception of one, found the discoloration to be caused by dark weeds growing on the bottom; 5 fathoms was the least water obtained. It will be prudent, however, to avoid the dark patches as much as possible.

In beating out of the bay the western shore southward of Acul River is free from danger, and there are from 7 to 10 fathoms water at

¾ mile from it. Do not stand nearer Etron du Porc than 7 fathoms. The shoal patches do not always show, but a good lookout should be kept for them and the lead going.

Abacou Point is low and skirted by a reef, said by some authorities to extend off nearly one mile, but Capt. Owen, R. N., says only 200 yards. Commander Haxton, U. S. N., reports a small reef stretching off shore between Gravios and Abacou points, and extending 1½ miles off shore, but with deep water inshore of it. Until a more thorough examination is made, the shore between these two points should not be approached.

Diablo Bay.—Between Point Abacou and Gravios Point there are two small bays, called Port Nonnettes and Diablo Bay. The latter is immediately west of Abacou Point, and has a small sandy beach at the head of the bay, over which a brook empties. The western point is bluff, and skirted by a reef to the distance of 400 yards.

Port Nonnettes is a little inlet open to the southward, and, like Diablo Bay, has a sandy beach and the mouth of a small stream at its head. Both points of the entrance are bordered by reefs to the distance of 400 yards. Coasters find temporary shelter from the prevailing winds in these two bays. Port Nonnettes is 3½ miles eastward of Point Gravois.

Gravois Point.—See page 291.

CHAPTER X.

MONA PASSAGE AND THE ISLAND OF PUERTO RICO.

The Mona Passage.—The channel between the islands of Haiti and Puerto Rico is clear of obstructions or dangers and is called the Mona Passage, from the small island of that name lying midway between Cape Rojo and Saona Island.

Mona Island.—Its summit is nearly flat, with a few bushes and trees, and it may be seen from a distance of 18 miles. It is of volcanic formation; its north, east, and NW. sides consisting of high perpendicular bluffs, afford no landing place. On the west and SE. sides are a number of caves forming entrances to extensive subterraneous galleries which run in every direction. The surface of the island is composed of calcareous slate-colored rock, full of holes containing soil in which the trees and brush-wood grow.

There are numbers of wild goats and hogs on the island, and turtles during the season.

A ridge of rocks run off the SW. point, and a vessel should not come inside the depth of 8 fathoms of water, which will be found at the distance of ¼ mile.

The eastern and northern parts of the island are said to be clear of danger and steep-to. The NW. end terminates in a promontory, and its extremity rises to a lofty perpendicular rock, which when on a bearing N. 6° E. (N. 6° E. mag.), or S. 6° W. (S. 6° W. mag.), has the appearance of a sail, with Monito open westward of it. From this end, named Cape Barrionuevo, round by south to the east end, the island is bordered by a bank of white sand and rocks with 18 to 3½ fathoms water on it. It extends off 1½ miles between capes Barrionuevo and Julia, also called Caigo ó no Caigo Point (I fall, or I don't fall). It takes the latter name from an enormous rock on its summit which is very curiously balanced and threatens every moment to fall. Between Cape Julia and the east end of the island the bank extends off ½ mile.

Santa Isabella Bay is called by the fishermen Uvero Bay. The bottom is of sand, but there are so many rocks that vessels are apt to lose their anchors. Vessels can stand in without risk to a depth of 6 to 8 fathoms and then anchor. The holding ground, however, is bad, and a sea always sets in, so that a vessel must be ready to put to sea as soon as there is any sign of a hurricane from the west or when the south or SE. winds set in.

El Sardinero is the safer anchorage. It is only worthy of the name during the season of southerly winds. The sea in it is then smooth, as it is sheltered by Arenas Point and the spit which makes out to the westward from the latter. The bottom throughout the anchorage is white sand, without specks, and the depth from 8 to 12 fathoms. Still it must be remembered that outside of the shoal and on the parallel of Cape Barrionuevo the bottom is rocky and the water very deep; hence it is necessary to stand well into the bight, where the bottom is white, without being alarmed at the rocky barrier at its head.

Landing.—In both Santa Isabella and Sardinero Anchorages the beaches are so foul that a landing can only be effected with great risk. In Santa Isabella Bay, however, there are several boat channels through the reef or rocky heads, and in the center of the bay, SE. of the western point, there is a clear beach about 150 yards in length, where a landing may be effected under favorable circumstances by veering the boat in from a grapnel. The points forming this bay are shallow. These landings are well known to the fishermen, and with their assistance a boat may land, unless the sea is very heavy. During the season of the Northers both of the above anchorages are untenable, as the wind from the gulf and the current from the passage cause a tremendous sea.

Water.—A little to the right of the landing in Santa Isabella Bay there is a pathway leading to water under the southern cliffs, and here firewood will be found. Indifferent drinking water will also be found in the lower parts of the grottoes.

Light.—A light is proposed on the east end, east point, of Mona Island. The light will be a flashing white light, showing flashes every 2 minutes. It will be elevated 164 feet above the sea, and should be visible, in clear weather, from a distance of 22 miles.

Tides.—The flood sets N. by E. and the ebb S. by W. at the rate of ½ mile an hour. It is high water full and change at the island at 6h. 15m. and the rise is about 2 feet.

Monito lies about 2⅓ miles N. 22° W. (N. 22° W. mag.) of Mona, with a clear channel between them. This little islet is somewhat circular, about 400 yards in diameter, and its sides are composed of steep, inaccessible cliffs, but much lower than those of Mona. It is quite barren, but frequented by numerous flocks of sea birds. At a distance its summit has the appearance of a shoemaker's last. There are 20 and 25 fathoms water at 100 yards from the west side of the islet. The only place where landing can be effected under favorable circumstances, but with much risk to the boat, is at a rock on the west side of the isl Here, in a small angle or indentation of the shore, vessels have anchore for guano in a depth of from 30 to 36 fathoms.

Desecheo or Zacheo, the other island in this passage, lies N. 5 E. (N. 52° E. mag.) about 27 miles from the NE. point of Mona. T island is about a mile in circumference, and almost entirely compos

of a remarkably lofty wooded hill, which may be seen at a distance of 36 miles. The few dangers which lie close to the shore always show themselves, and are steep-to. When seen from the SW. the south side appears very precipitous; but from the northward it appears more lengthened out, and it will be found a very useful object in navigating the western side of Puerto Rico. There is no anchorage under it.

Currents.—Near the sides of the Mona Passage there is generally a very perceptible current, frequently running to the north and NW. with a velocity of one or 1½ miles an hour. In the middle of the passage the general direction of the current is with the wind to the SW. The tides, also, in some parts of the passage, run with great force, especially to the southward of Cape Egaño, where, during the month of May, a velocity of 3½ miles an hour has been experienced. The flood runs 9 hours to the SW., and the ebb to the NE. during 3 hours. Sometimes precisely the contrary duration occurs, and the tides have been known to run 6 hours in each direction. These irregularities necessitate great caution in navigating, and have doubtless been the cause of very many disasters.

Directions.—The Mona Passage is much frequented by vessels bound from ports in the United States to the Spanish Main and neighboring islands, and by those from Europe bound to Jamaica and ports on the southern coasts of Haiti and Cuba. Especially is this the case in the winter, when the wind is apt to blow from the northward of east.

It has already been stated that there is no danger to fear this passage; but great caution must be used in the vicinity of Saona Island, which is low and foul, and a berth of at least 6 miles should be given it. Squalls are of frequent occurrence, especially in summer. They blow sometimes with hurricane force for a short time, and although they often rise rapidly, always give warning of their approach.

Puerto Rico.—The island in 1509 was invaded by Spaniards from Haiti, and has since that time been a Spanish colony.

A range of lofty mountains called Luquillo, covered with wood and intersected by numerous deep ravines, runs through the center of the island, beginning near the NE. point and terminating south of Arecibo in a hill called the Silla de Caballo. The highest peak of this chain (3,714 feet high) is visible in clear weather from a distance of 68 miles; it forms an excellent landmark. It is called El Yunque, or Anvil Peak. In the interior are extensive Savannas, on which large herds of cattle are pastured, and along the coasts are tracts of level fertile land.

The principal ports of export are San Juan and Arecibo on the north coast, Aguadilla and Mayaguez on the west, Guanica, Guayanilla, Ponce and Arrayo on the south, and Humacao and Naguabo on the east coast.

The coasts of the island are by no means well known, and urgently need to be resurveyed.

On the eastern coast of Puerto Rico there are nine small rivers emptying into the sea, and several ports frequented by small vessels to load with sugar and molasses. The instructions which can be given for this coast are so deficient that it would be by no means safe for a stranger to cruise here without a pilot, who may be obtained at San Juan, St. Thomas, or sometimes at Port Mula, on Crab Island.

The population in 1880 was 666,000.

Hurricanes.—Although the island is south of the usual track of hurricanes it has been severely visited by them. The cyclones of 1782 and 1825 were especially destructive.

Custom Regulations.—A decree was issued in 1877 making it compulsory that all goods be consigned to an established merchant; so that merchants only can clear a package through the customhouse, and not then unless it is consigned to them. The rules concerning manifests are very stringent, and are in accord with those of Cuba. Fines from $25 to $1,000 may be inflicted for breach of custom regulations, and entire confiscation of ship and cargo.

Coal when carried as sale cargo is exempt from tonnage or discharge duties; other articles on board, however small, will subject the whole cargo to duties.

A bill of health certified by Spanish consul will be required. Vessels failing to present a manifest in the required form will be fined $500.

Port Charges.—Interpreter, $4. Stamped paper, $8.75. Tonnage dues, $1 per ton of cargo, gross. Clearance, $1 to $8, according to value of cargo outwards. Sanitary visit: Vessels of 200 tons, $10; 250 tons, $11; 300 tons, $12; 350 tons, $13; 400 tons, $14; above 450 tons, $16. Labor costs $1 per day. Ballast, 50 cents per ton discharging. $1 per day for guard while marking.

Light.—On Cape San Juan a fixed white light, with red flash every three minutes, is shown at an elevation of 266 feet, and should be visible 18 miles. The lighthouse is cylindrical and dark gray in color.

Cordilleras.—A chain of islets and reefs, called the Cordilleras, extends from Cape San Juan for 11 miles. The eastern group of these islets is called the Barriles. They are steep-to, and between them and the Washer and Cactus Cays there is a channel 2 miles wide and 10 fathoms deep.

Barriles Passage.—With a SE. wind, a vessel bound northward may easily pass to the eastward of Puerto Rico and through this channel. It is also available for vessels bound from the north to any of t ports on the east or south coasts with NE. winds.

Hermanos Passage, is formed between the Barriles and the H manos Rocks, and carries about 10 fathoms water.

San Juan Channel, between the head of the same name and t western extremity of the Cordilleras, is about ¾ mile in breadth, an or 10 fathoms deep. This is, in general, the best channel for ves

from the east coast of Puerto Rico with the wind from the NE. The western extremity of the Cordilleras, which forms the north boundary of the channel, is composed of two groups of rocks a little elevated; the easternmost of the two is named Icacos, and the western group Cucaracha; the latter is nearly on the meridian of San Juan Cape.

Port Fajardo lies south of Cape San Juan. It is between Cueva Point on the north and Barrancas Point on the south, and has a depth of from 16 to 23 feet.

On a point abreast of Obispo Islet is a battery, and a few houses are scattered along the beach. The town of Fajardo is 1½ miles inland. Population, about 3,000.

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This port is only a narrow canal, sheltered from easterly winds by three islets, called Obispo, Zancudo, and Ramos, and also by a reef between the two latter having 6 to 12 feet of water on it, where the sea breaks in some places. The northern and southern ends of this reef form, with the islets of Zancudo and Ramos, two narrow cuts, having 23 feet of water. The southern passage is the widest, but neither should be attempted except in case of emergency.

There are two entrances into Fajardo. Through the southern one a depth of 18 feet may be carried, and it is entirely clear. It lies between Point Barrancas and Ramos Islet.

The northern entrance is between Point Cueva and Obispo Islet, and has from 4 to 6 fathoms of water. Nearly in the middle of the passage is a coral patch, with only 6 feet of water on it, which requires great care to avoid. Although narrow, this channel is the best to enter by.

In approaching Fajardo from the eastward through the channel between Culebra and Crab Islands, the navigator may choose from three channels: 1st, between the Cordilleras Reef and Palominos Island; 2d, between this island and the Largo Bank; and, 3d, between the Largo Bank and the chain of islets and reefs extending to the eastward, called Piraguas and the Lavanderas.

Although the first named channel is the narrowest, it seems best, from the fact that all its dangers are apparent to the eye. With the wind from the NE. it leads to windward of the port. The depth in this channel is from 8 to 12 fathoms; in the second from 7 to 11 fathoms, and in the third from 6 to 8 fathoms.

Pilots cruise off the NE. point. To signal for them, hoist national colors at foremast head. Pilotage (compulsory), $5 for vessel, without regard to size. For shifting berth, $2.

Quarantine Dues.—If vessel is quarantined, $2 for each visit. Port warden's fees, $4.

Supplies.—Water, $1 per puncheon alongside. Vessel's stores, scarce and dear. Coal, $5 to $6 per ton alongside. Commissions on collecting freight, 2½ per cent; on disbursements, 2½ per cent; on procuring freight, 5 per cent.

Middle Channel.—To pass through this channel between Palominos and Largo Bank, the track lies about one mile south of Palominos Island.

The Southern Channel is bounded on the north by the Largo Bank, and on the south by the Piraguas and Lavanderas Rocks and the Piñero Islands, with a width of 2 miles. In using it, keep Soldiers Point on Culebra Island, bearing S. 87° E. (S. 86° E. mag.) until the center of Palominos Island bears N. 17° E. (N. 18° E. mag.); the Largo Bank will have then been passed, and a course may be shaped towards Ramos Island to enter Port Fajardo by the southern passage.

Palominos is of moderate height, and covered with trees. Its shores are foul to the distance of ½ mile. Anchorage may be found about one mile off its western shore in 6 or 7 fathoms of water.

Largo Bank is narrow and steep-to. The sea generally breaks on it. As before stated, this bank forms the south side of the middle channel of approach to Port Fajardo.

Between Largo Bank and Ramos Islet there is a clear channel with 7 fathoms of water in it. The least water on the bank is said to be 13 feet.

Great and Little Piñero Islands are to the northward of Puerca Point, the eastern extreme of Puerto Rico. Farther to the eastward, and forming a chain of dangers, are the Lavanderas Rocks and the Piraguas. There are deep channels among these rocks and shoals, but without a pilot it would be prudent to pass to the eastward of them.

The Piñeros are two small islets, covered with wood and lying between Medio Mundo Point and Puerca Point, which is also low and wooded. On the western side of Great Piñero is a reef which extends northerly to Medio Mundo Point, forming a bar on which there is only 13 feet of water. The channel between this islet and the main land is only fit for boats.

Between the reef which extends from the shore between these two points on one side and the reef skirting Great Piñero Island on the other there is a narrow bight where small vessels may anchor, but it is unsheltered to the SE. and south.

Little Piñero is nearly joined to the south end of Great Piñero by a reef, on which there are 13 feet of water. Near the eastern side of this islet there is a small detached rock, above water.

The Descubridor is a small head between Little Piñero and the Chinchorros lying about 1¼ miles southward of the western Lavandera. This danger is marked on the charts as of doubtful existence.

The Lavanderas are two small rocks on which the sea genera breaks. They are steep-to, with 5 fathoms of water close to them, a about 1¼ miles apart.

The Piraguas are two small rocky islets, 1⅓ miles apart; they m be seen at a considerable distance, are steep-to, and have a clear pr sage between them, with not less than 5 fathoms of water.

The Chinchorros are two dangerous shoals. The northern shoal is small and has 13 feet of water on it, with 5 fathoms all around. The southern shoal is ¾ mile long and ½ mile across, with only 5 feet of water on it; it is also steep-to. On both these shoals the sea generally breaks.

A vessel may pass between these dangers or between the northern shoal and the Piraguas. A more prudent course would be, however, south of all of them. Soldiers Point, kept on a bearing of N. 69° E. (N. 70° E. mag.) will lead clear of these dangers.

Caution.—Other shoals have been reported in this locality.

Bahia Honda.—This bay, a little westward of the south point of Puerca Island, is about a mile in extent, and open to the southward; it is protected by reefs which contract the channel from a mile to about ¼ mile in breadth. The eastern side of the bay terminates to the southward in a low sharp point; the west side in a bold headland, crowned by a little hill; near the latter a dry rock will be seen on the reef, and off the former the Cabras, two small flat islets, covered with brushwood. The reef, which bars the entrance, skirts also the interior of the bay, and some of the patches within have only 13 feet water on them, but these and the reef are easily seen. The River Aguas Claras flows into the NE. corner of the bay.

Directions.—To enter Bahia Honda, the south point of Puerca Island should be brought to bear about N. 12° W. (N. 11° W. mag.) when this course will lead up toward the entrance of the harbor. In entering, the eye from aloft will be the best guide for avoiding the reefs and shoal patches, and for picking out a clear spot for anchoring.

The anchorage has from 5 to 8 fathoms of water, but as it is open to the southward and is quite limited in extent, a large vessel had better lie outside in from 6 to 8 fathoms.

Algodon Bay.—From the western point of Bahia Honda to Lima Point the coast forms a large bay, in the middle of which is the islet of Algodon, moderately high, and near the coast. In this bay, which is sheltered from SW. round to NE., by way of north, the depth of water varies from 16 to 13 feet near the shore. Three small streams empty into it.

Just outside of a line drawn from Lima Point to Algodon Point are three shoals.

Algodon Bank nearly ½ mile in extent, with 2 fathoms water on it, lies with its eastern part on the meridian of the west part of Algodon Point, which is a large round headland, and from the southward presents a face nearly ½ mile in extent. The south part of the bank is about ½ mile from the point; the channel between is 400 yards in breadth, with 3½ to 4½ fathoms water. In steering through, haul round Algodon Point, and anchor in 16 feet water.

Piedras Bank is separated from the Algodon Bank by a narrow channel. The position of this bank is doubtful, but it is supposed to lie with Algodon Islet, bearing between N. 52° W. (N. 51° W. mag.), and N. 71° W. (N. 70° W. mag.).

Lima Bank, a rocky ledge nearly awash, the sea generally breaking upon it, lies about ¾ mile S. 80° E. (S. 79° E. mag.) of Lima Point. It is about 600 yards in diameter. About 1½ miles S. 43° E. (S. 42° E. mag.) of Algodon Islet there is said to be a sunken rock.

There is a good channel between the Lima and Piedras Banks, in which the least depth of water is 10 feet, but as the position of the foregoing dangers can not be accurately given, the neighborhood must be approached with great caution.

The Port of Naguabo lies between Lima Point and Santiago Cay. One and a half miles west of Lima Point the River Naguabo empties. On its western bank is the little village of Ucaris, off which, in the mouth of the river, there is anchorage for a few coasters, with the wind from SW. round by north to east. Large quantities of cattle are exported from here to the other islands. The town of Naguabo lies 2 miles inland.

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Dues.—Tonnage dues, $1 per ton; anchorage, $4; interpreter and doctor, $12; pilot and port captain, $16. These dues are for a vessel of 280 tons.

Santiago Cay is small and of moderate height. From its SE. side a reef extends in a SE. direction to the distance of one mile and in some parts is nearly dry. Its northern shore is perfectly clear. Candeleros Point may be known by the little hill upon it, and between the point and the islet is Puerto Humacao.

Candeleros Point is bordered by a reef extending off a short distance. About one mile north of the mouth of the River Humacao, which empties into the bay, are two small islets called the Morrillos.

No trustworthy directions can be given for the anchorage.

Humacao.—The town of Humacao is 2½ miles inland, on the river of the same name.

Dues.—Pilot, in and out and entry, $36; interpreter and stamps, $12; anchorage and port captain, $26.50. These dues are for a vessel of 280 tons.

In approaching either Naguabo or Humacao, the best route is south of Crab Island.

Icacos Bay, south of Humacao, lies between Candeleros Point and Icacos Point.

Port Yabucoa.—Icacos Point is nearly 2 miles southward of that of Candeleros, and may be known by a small rocky islet near it. Port Yabucoa is between Guallane Point, which is a little southward of th[illegible] of Icacos, and Yeguas Point further on. The River Guallane here r[illegible] into the sea. The village of Yabucoa stands about 2 miles in the in[illegible] rior, nearly abreast the west end of Crab Island.

Port Maunabo is formed by Cape Mala Pascua, the SE. end Puerto Rico, on the south, and Tuna Point on the north. The town situated some miles in the interior, on the borders of the river wh[illegible] empties itself into the port.

General Directions.—The sea on the east coast of Puerto Rico is generally smooth, so that vessels may lie comfortably in the anchorages. On leaving them, time will be saved by passing out through the Barriles or Hermanos Passage instead of running round the west end of Puerto Rico and out through the Mona Passage. Being off the SE. Coast of Puerto Rico and near the entrance to the channel formed by it and Arenas Banks, when standing toward the Lima Bank, the west point of Bahia Honda should not be brought eastward of N. 27° E. (N. 28° E. mag.). When approaching the north end of the Arenas Reef, in standing to the southward do not open out Cape Mala Pascua off Naranjo Point. When El Yunque or Anvil Peak is shut in with the hill on the west point of Bahia Honda a vessel will be to the eastward of the Arenas Reef, and the southern boards may be prolonged.

Do not, however, bring Cape Mala Pascua to the westward of S. 64° W. (S. 65° W. mag.), which will avoid the Musquito, Corona, and Caballo Blanco Banks, which lie off the north shore of Crab Island, in the neighborhood of Port Mula, and on which the sea does not always break. In standing to the northward, go no farther than to bring West Mountain, St. Thomas, in one with Soldiers Point, Culebra, N. 75° E. (N. 76° E. mag.), until to windward of the South Chinchorro Bank, which lies with the south point of Palominos in one with the westernmost Piraguas. When the latter is in one with Zaucudo Islet, N. 51° W. (N. 50° W. mag.), a vessel will be to the eastward of the Chinchorros and eastward of the narrowest and most dangerous part of this channel, and may then work to windward without fear.

When sufficiently far to the eastward, a vessel may pass out through the channel between the Barriles and Hermanos Islets or between Icacos, Cucarachas (the westernmost of the Cordillera), and San Juan Head, according as the wind may be to the northward or southward of east. The last being the westernmost, she may proceed through it as soon as she has rounded the eastern Piraguas, which, however, must be given a wide berth.

With the wind from the NE. a vessel may beat through in a day and a half, and from the SE. may run through in half a day.

With a pilot it may be accomplished in much less time, as follows:

Having cleared the north extreme of Arenas Bank, steer to the northward, so as to pass between the western Lavanderas and the Little Piñero, or between the Lavanderas, on which the sea always breaks. Steer east or west of the Largo Bank, and thence west of Palominos, and through the channel by San Juan Head; but to do this the wind should be to the southward of east. In passing between the Little Piñero and the western Lavanderas, bring the outer extremity of San Juan Head on a N. 18° W. (N. 17° W. mag.) bearing, which course will lead to the westward of Largo Bank and close up to the head. In taking this route the position assigned to the doubtful Descubridor Bank, said to be about south 1¼ miles from the western Lavandera and about the same distance from Little Piñero, should be carefully avoided.

These directions, however imperfect, will serve to point out the most prominent dangers and at the same time warn strangers not to get entangled among them without the assistance of a pilot.

The Tides on the eastern coast of Puerto Rico run with great strength to the NE. 7 hours and to the SE. 5 hours.

The North Coast of Puerto Rico is rugged and uneven; it runs in a nearly straight line east and west, and between San Juan Head and Port San Juan presents no shelter whatever. San Juan Head slopes gradually from the summit of the hills to the sea and terminates in a low, but clearly defined point; for about 14 miles westward from the head, the coast is composed of dark, rugged looking cliffs, breaking down from the mountain side, but as the hills turn inward the land becomes low and undulating and appears to be well cultivated, many chimneys of steam sugar-mills being seen above the trees. From off the west end of this high and cliffy portion of the coast, the fortifications and part of the city of San Juan will be seen. The shore appears to be skirted by a reef, inclosing numerous small cays and islets, rove which the sea breaks violently, and it should not be approached within the distance of 4 miles.

A small rock, with 14 feet over it and 5 and 6 fathoms around, is said to exist about 20 miles eastward of Port San Juan and 3 miles off shore.

Los Embarcaderos Point will not be noticeable until well to the westward of it, when it will be seen projecting, low and covered with trees.

From Luquillo to the Loisa River the coast is low, with a range of hillocks 2 or 3 miles inland; back of Loisa is a hill, which, seen from the eastward, looks like an island. Between the Herrero and Loisa Rivers and between Vacia Telegas and Maldonado Points are white sandy beaches.

Vacia Telegas Point is formed by two low bluffs, covered with trees. Maldonado Point has the appearance from the eastward of an island.

Morro of San Juan will be easily recognized by the lighthouse. When within 5 miles of the entrance Cabras Island will open out; upon it are several buildings, and off the eastern end of it is the wreck of a steamer.

Port San Juan.—About 30 miles west of San Juan Head is the harbor and city of San Juan. The city is well laid out and is one of the healthiest cities in the West Indies. It is situated on Morro Island, which forms the north side of the harbor, and is separated from t mainland by a narrow creek, called the channel of San Antonio.

The city is almost hidden from seaward by the high land on t northern shore.

The population is about 20,000. The sanitary condition of the ci is good. The streets are clean and the people orderly.

The authorities to visit are the captain-general and the commodore of the station.

The United States is represented by a consul and vice-consul.

Coal can be had in any quantity. The amount usually on hand is about 3,000 tons and costs $9 per ton. It is transferred to the ship by lighters, which hold about 10 tons each.

Provisions can be had; beef is quite poor; vegetables are good and quite cheap.

Water.—Either spring or rain water can be had at a cost of one cent per gallon. There are two water-boats.

Quarantine is strict and well maintained. There is a quarantine station on an island. A health officer boards all vessels.

There are three hospitals: one military, which is for the use of the soldiers, and two private, which are small and cost $2 per day. For subscribers, only $1 per day.

Steamers of the Lopez line from Havana to Liverpool, three times a a month; to Bremen, three times a month; Barcelona, four times a month; and the Atlas line.

Telegraph.—There is cable communication with St. Thomas; also a telegraph line connecting the principal places on the island.

Customs duties are high; nearly everything is taxed.

Pilots are efficient, but are not necessary for a steamer. Pilotage is $17 in and out and $4 for moving a ship in the harbor.

Lifeboat.—A lifeboat and life-saving apparatus have been established at San Juan.

Light.—The lighthouse on Morro Point exhibits a fixed light having a flash of five seconds duration every minute. The light is elevated 171 feet above the sea and should be visible 18 miles.

A Semaphore is erected in the Morro Fort, with which vessels may communicate by using the International code of signals. A black ball is hoisted on the gaff of the signal mast to indicate the probable approach of a storm.

San Juan Harbor.—Towards the east and south the harbor is sheltered by the low swampy land of Puerto Rico, and on the west by the Cabras Islands and the shallow banks which connect them to the shore. The Cabras consist of four small islets and two small detached rocks close off their east end, the nearest of which lies 800 yards westward of the Morro Point; foul ground extends for nearly 400 yards off them. On Cabras Island (the largest) are two large hospital dwellings, and on the southernmost islet, called Canuelo, there is a fort which commands the entrance. Between the Morro and the Cabras the channel into the port is barred, and with strong northerly winds it breaks and becomes dangerous, although it carries a depth of from 4½ to 5½ fathoms.

Off Morro Island, at the eastern point of entrance, the ground is foul for about 200 yards, the eastern side of the channel being marked by a

red buoy moored in 17 feet of water on the edge of the bank called St. Helena Shoal. The channel is here little more than 300 yards wide, its western edge being unmarked except by a wreck (of a steamer). Within this edge the western bank sweeps round, forming a deep bight, terminating in a sharp point at the Tablazo Shoal, on which is a red buoy, and farther in on the same side of the channel there is another red buoy.

St. Augustine Shoal also makes out from Morro Island to about 200 yards from the shore, nearly abreast of San Juan Gate. Its edge is marked by a red buoy.

Vessels of large draft, or those intending to make but a short stay, will find the most convenient anchorage between the St. Augustine and Tablazo Shoals, abreast of St. Juan Gate.

The Puntilla Shoal extends about 300 yards southward of the sandy point of that name; the channel here is about 250 yards across, with 3½ to 6 fathoms water, its weather side being the deepest.

To the eastward of these sand spits is the inner port, with a depth of from 3½ to 4½ fathoms, and quite secure against all winds, but the water is very foul, owing to the number of sewers emptying into it. The Punta Larga Shoal is marked by three red buoys; there is also one on the northern edge of the Anegado Shoal. There are two mooring buoys for the English and French mail steamers, and in the inner harbor, eastward of the arsenal, is another mooring buoy for Spanish ships of war. Yufri Shoal has been dredged to a least depth of 25 feet.

The inner channel has, it is stated by various authorities, filled up considerably of late years, and there is probably less water there than is marked on the charts.

Directions.—Vessels entering this port are recommended to take a pilot, as dependence can not always be placed on the buoys marking the shoals being in position; and as vessels are seldom boarded by a pilot till within the harbor entrance, caution should be specially observed regarding the buoy intended to mark the SW. extreme of St. Helena Shoal, east side of entrance to the port. This buoy has at times drifted, and vessels run into danger.

Approaching from the eastward, run down the north side of the island at the distance of not less than 3 miles, until Salinas Point comes a little open to the northward of Great Cabras Island; keep on this line until the mouth of the harbor comes open, when steer for it, giving the Morro Point a berth of a good 200 yards, and having rounded the buoy on St. Helena Shoal, haul up for the anchorage abreast San Juan Gat with the wind well to the northward this may be gained, but should be southerly, having passed the Morro, shoot as far in as possible a anchor, towing or warping up when the wind falls. With the wi strong from the northward the sea on the bar frequently breaks a becomes dangerous. On account of the difficulty of steerage great ca

tion must be used. In a sailing vessel, a pilot will be necessary for the inner port, where the holding ground is excellent, and the land eastward of the town being low, the benefit of the cool trade wind is felt, but, as before stated, the water is foul. No good leading mark can be given for the narrow channel between the outer anchorage and the Puntilla Shoal, and as the water is muddy, it cannot be distinguished by eye.

Inner Harbor.—The channel to the inner harbor is marked by three red buoys on the port hand and two small light-red buoys on the starboard hand. From the outer harbor the passage to the inner harbor will look puzzling to a stranger, as more than this number of buoys will be visible.

To enter the inner harbor, steer to pass the red buoy off San Juan Gate at 100 yards distance, and then between the red barrel buoy off the Barrio de la Puntilla and the two conical light-red buoys on Tablazo Shoal, keeping well over to the port hand. When abreast the inner conical buoy, the barrel buoy off the end of Puntilla Shoal will not fail to be recognized, and it must be passed close-to on the port hand, and two small red buoys on Punta Largo Shoal, off the city, brought immediately on the starboard bow, to avoid going on that shoal. Moor with open hawse to the NW. in the outer, and to the NE. in the inner harbor.

Tides.—It is high water, full and change, in port St. Juan at 8h. 2m.; springs rise about 1½ feet.

Coast.—The north coast of Puerto Rico from San Juan to Arecibo, a distance of 33 miles, affords only indifferent anchorages, of which Manati is the best.

Manati River.—Coasters and other vessels which ship the produce of this coast anchor either at the mouth of the river, where there is no shelter and where landing is impracticable in bad weather, or at Palmas Altas, which is more secure with ordinary winds. In fair weather the coast may be approached within a mile, in depths varying from 15 to 26 fathoms.

Tortuguero is a small town on the shore, about 20 miles westward of Port San Juan. This part of the coast as far as Arecibo should not be approached within 3 miles.

Arecibo River, having its outlet east of the town of that name, has 3 feet of water on its bar. When much flooded the river forms another channel to the westward; but this entrance is always dangerous on account of the reefs which skirt that part of the coast. The river rises in the mountain chain which traverses the island in an east and west direction; and between Utuado, a town near its source, and Arecibo, a considerable trade in provisions is carried on by means of rafts.

Between Arecibo and Aguadilla the coast affords no shelter even for coasting vessels.

Arecibo is a small reef harbor of considerable commercial importance, about 12 miles westward of Tortuguero, but in the winter season it is only safe for small vessels that can get inside the reef. At that period vessels of large draft will find anchorage on the bank, about 2 miles off shore, but they will ride heavily and must be prepared to slip the moment the wind threatens to veer to the northward or westward. In the months of April, May, June, and July vessels of moderate draft may venture farther in, and anchor under the reef in from about 3½ to 4 fathoms water.

The town stands on the western side of the bay, and is protected by a circular fort to the eastward of it. About a mile to windward of the town a tower and signal post will be seen on a steep hill. Near the center of the reef is the cut or channel for small vessels, and at the east end, between it and the cliff, there is a passage for boats.

There is a rivulet of excellent water, deep enough to admit launches, at the NE. end of the bay, near the town of Arecibo.

Population is 8,000.

The United States is represented by a consular agent.

Port Charges.—For a vessel of 226 tons, with ballast in and cargo out, the expenses were $408.

Coast.—From Arecibo to Point Agujerada, 24 miles to the westward of it, the northern coast of the island is flat, low, and sandy. It there takes a SW. direction for a mile, and is formed of bold, rocky cliffs. Bruquen Point may be rounded within a mile, where the depth will be from 20 to 25 fathoms; but the coast here is fringed with reef, and must be cautiously approached.

Light.—From a red masonry lighthouse on Bruquen Point is exhibited, at an elevation of 65 feet, a light visible 14 miles. The light is flashing red and white alternately every ½ minute, and is reported irregular.

West Coast.—From Bruquen Point the coast curves outward to the SW. for about a mile, and again becomes low and sandy as far as Peñas Blancas Point, which is covered with trees.

Aguadilla Bay.—On the northern shore of this bay is the town of San Carlos de Aguadilla, on the banks of the river from which it takes its name.

Toward the southern part of the bay is the village of San Francisco.

The town of San Carlos is an excellent place to obtain water and all kinds of provisions.

Vessels of any size may anchor here with ordinary wind, but during the winter months a heavy swell rolls into the bay. The only dangers are the reef off Peñas Blancas, and the sand bars at the mouths of the small streams, which extend off about 400 yards.

A narrow bank of soundings, about ¼ mile wide and very steep-to, skirts the shore. In anchoring, be careful not to do so too near the edge of the bank, as a vessel is liable to drag off. In the winter time it

would be prudent to be prepared to go to sea at once upon any indication of a shift of wind to the north or NW.

A good berth will be found with the church in the town of San Carlos bearing S. 84° E. (S. 84° E. mag.), and the north point of the bay N. 11° W. (N. 11° W. mag.), in 18 fathoms, about ½ mile from the shore. In approaching Aguadilla Bay from the southward, care must be taken to keep Jiguero Point to the eastward of N. 11° E. (N. 11° E. mag.), to avoid the foul ground which extends as far to the southward as the SW. point of the island.

The population of the district is about 12,500. The Herrera line of steamers call here, also the Atlas line.

Rincon Bay is between Jiguero Point on the north and Cadena Point on the south. The bottom is foul and affords no good anchorage.

Pelegrino Reef has 10 feet of water over it, and on it four vessels have been lost. It lies about one mile off the coast, midway between Cadena and Jiguero Point. The reef is not discernible in ordinary weather, and caution is necessary when navigating in this vicinity.

Cadena Point, 4 miles southward of Aguadilla Bay, should not be approached within the distance of a mile.

Añasco Bay lies between Cadena and Algarrobo Points. There are many factories in the neighborhood. The River Añasco empties itself into the bay, and has thrown up a shallow bar before it, which extends more than ½ mile from the shore. Outside this there is well-sheltered anchorage, with the prevailing winds for vessels of the largest draft. The outer Las Manchas, the northern of the outlying shoals off this bay, with only 2 fathoms water on it, must be carefully avoided.

Mayaguez Bay lies between Algarrobo and Guanajibo Points, and is about 3 miles wide and 1½ miles deep. In the northern part of the bay the depth gradually decreases from 10 to 4 fathoms towards the shore; but shoals extend across the entrance, requiring great attention in working in. The anchorage affords excellent shelter from northerly winds, and admits vessels of any size, and is undoubtedly the best anchorage in the island.

From Algarrobo Point (which may be known by a house with a red roof, built upon high piles, on the hill just above the point) the coast of the bay trends to the SE. for 1¼ miles to Little Algarrobo, a low, sandy point, on which there is a sugar factory, with a chimney and some blue buildings around it. There are two sugar factories with high chimneys situated at the northern part of this bay, about ¼ mile north of Algarrobo Point. The shore between is foul for 600 yards off; and SW. ½ mile from Algarrobo Point lies the reef of that name, which at the outer part is nearly dry and steep-to.

At about ¼ mile southward of Little Algarrobo Point, at the head of the bay, is the entrance to the River Mayaguez, in which small droghers lay up for the hurricane season. The river is a ditch of the smallest

proportions, almost dry at the entrance. There is an iron bridge across it, and before it is the best anchorage, sheltered from the northward round by east to SW., with good holding ground. Thence the low shore bends round to the SW., with shallow water some distance off, and north 1½ miles from Guanajibo Point a spit runs off nearly a mile from the shore.

Mayaguez is a thriving town of 8,000 inhabitants, healthy, lighted with gas, and has excellent water. Tram cars run from the custom-house to the town.

The town is clean, orderly, and well kept. Generally but one family lives in a house. Yellow fever is sometimes epidemic. The temperature in summer ranges from 75° to 90°.

There is telegraphic communication with the principal ports of the island.

The authority to visit is the military commandant.

The United States is represented by a commercial agent.

Supplies.—Provisions are nearly all imported from the United States and are expensive.

Water can be had, both spring and rain water. Cost, $2.50 per ship, no matter what quantity is taken. Ship's boats must be used.

Steamers.—The Atlas line makes monthly trips, and the Ramon de Herrera line (Spanish) three times a month.

Quarantine is not very strict; there is a health officer. There are two hospitals—one private, which has six beds for foreign seamen at a cost of 50 cents per day; also a military hospital, for the use of the soldiers.

Port Charges.—Pilot and harbor-master's fees, $10. Interpreter, $4. Tonnage dues, $1 per ton of cargo. Health visit: Vessels of 150 tons, $9; and on each 50 tons in excess of 150, $1 additional. Customhouse fees, in and out, and stamped paper, $17.50. Discharging ballast: Sand, 50 cents per ton; stone, free; ballast guard, $2 per day. Discharging general cargo, $10 per load of 40 tons.

Lights.—Two small red harbor lights shown from the wharf serve as a guide to boats at night for the landing place.

The Tide rises and falls in Mayaguez Bay from 2 to 3 feet, but no exact determination of the time of high and low water has been made. The periods are said to be irregular.

Guadeloupe Reef.—In 1876 the French mail steamer Guadeloupe ran aground while entering Mayaguez Bay. The following bearings were taken while the vessel was aground: Jiguero Point, N. 20° W. (N. 20° W. mag.); Desecheo Island, N. 60° W. (N. 60° W. mag.). No information has been received as to the vessel's draft, or as to the depth of water on the bank.

Tourmaline Reef.—Westward of Mayaguez, an extensive reef having as little as 4 fathoms of water over it, and possibly less, was recently passed over by H. M. S. Tourmaline. From the reef the peak

Cerro Montuoso (8 miles eastward of Mayaguez) bore east (east mag.); Desecheo Island, N. 30° W. (N. 30° W. mag.). The bottom is apparently of coral, with remarkable white stripes extending north and south across it. The bottom was visible in 12 fathoms.

The Outer Las Manchas is the northern and outermost of the shoals at the entrance of Mayaguez Bay, and lies N. 68° W. (N. 68° W. mag.) about 2½ miles from Algarrobo Point. It is about ½ mile in extent, with from about 2 to 4 fathoms water on it, and sometimes breaks. The dark discolored water may be seen at a little distance.

The Inner Las Manchas lies ¾ mile S. 45° E. (S. 45° E. mag.) of the Outer Las Manchas. It is ½ mile in extent with 2 to 3 fathoms water on it. Between it and the Algarrobo Reef there is an inner channel a mile wide, with 5½ fathoms in it.

Allart Bank.—This bank, on which a Danish frigate of the same name struck in 1833, is about ¾ mile in length and ½ mile in breadth, with from 1½ to 2½ fathoms water on it, the shallowest part lies N. 17° W. (N. 17° W. mag.) of Guanajibo Point and S. 56° W. (S. 56° W. mag.) 2 miles from Algarrobo Point. The passage between it and the Inner Las Manchas is ½ mile in breadth, with from 3½ to 4½ fathoms water, and is the principal channel leading to the anchorage of Mayaguez.

Rodriguez Bank.—The northern edge of this shoal is about 1½ miles to the southward of the Allart and just without the line of the bay. It is about ½ mile in extent and dry in several places. Between the Rodriguez and the Allart there is a bar with 13 to 16 feet water over it.

The channel between Rodriguez Bank and Guanajibo Point has 13 feet least water and is used only by coasters.

Pierre Blanche (white rock) is a small patch of one fathom, lying just within the line of the Allart and Rodriguez Shoals, at about an equal distance from each. It obstructs the passage between these banks.

There is said to be good anchorage to the westward of the Mayaguez Banks, but in the absence of trustworthy information of the neighborhood it should be approached with caution.

Buoys.—Las Manchas (inner) buoy is a red barrel buoy and lies in 29 feet water with Algarrobo Point bearing N. 80° E. (N. 80° E. mag.) and Guanajibo Point S. 13° E. (S. 13° E. mag.).

Algarrobo Reef buoy (black and white) lies on the following bearings: Algarrobo Point N. 45° E. (N. 45° E. mag.); Guanajibo Point S. 5° W. (S. 5° W. mag.).

Las Manchas de Afuera buoy (red) lies on the following bearings: Algarrobo Point N. 55° E. (N. 55° E. mag.); Guanajibo Point S. 10° E. (S. 10° E. mag.).

Coronas de Guanajibo buoy (red) lies on the following bearings: Guanajibo Point south (south mag.); Algarrobo Point N. 15° E. (N. 15° E. mag.).

Roble buoy (black and white) lies on the following bearings: Algarrobo Point N. 8° E. (N. 8° E. mag.); customhouse N. 52° E. (N. 52° E. mag.).

Directions.—A good mark for entering Mayaguez Bay through the channel between Allart Bank and Inner Las Manchas is Cerro Montuoso Peak in line with the northern and higher hummock of a wooded, saddle-shaped hill bearing S. 79° E. (S. 79° E. mag.).

For a steamer, or for a sailing vessel with a fair wind, the best course will be found by bringing Montuoso Peak over the customhouse, bearing S. 73° E. (S. 73° E. mag.).

The customhouse is near the water's edge, and is the most southerly of four large houses with flat roofs, lying close together. The church on with Montuoso Peak also leads over the bar of the Mayaguez River, in 12 feet of water. If the buoys are in place a vessel has only to steer in midway between them.

In beating in, a vessel may stand toward Las Manchas (inner) until the customhouse and church are one; but to the southward, towards the Allart Shoal, she must tack before the peak of Montuoso comes in line with the church, until within the two shoals. When the land to the southward of Guanajibo Point is shut in with that point bearing south a vessel will be eastward of the outer banks. In coming from the northward, the channel may be taken between Las Manchas and the Algarrobo Reef. In this case take care not to haul in round Algarrobo Point until the peak of Montuoso opens south of the chimney of Vigo's sugar house, which is white and a conspicuous object near the shore north of the Puntilla Battery.

With a large vessel it is advisable to take a pilot.

Coast.—The coast between Mayaguez Bay and Cape Rojo is foul, and bordered by rocky shoals which extend fully 1½ miles seaward. The approaches to this part of the coast are rendered dangerous from the want of definite knowledge as to the positions of the various offlying rocks and shoals.

Port Real de Cabo Rojo, about 9 miles south of Mayaguez Bay, is almost a circular basin ¾ mile in diameter, with a depth of 16 feet in the center. The channel, which is very narrow and tortuous, carries 9 feet water, and lies near the south part of the entrance. From the north point an extensive reef runs off, which, after skirting Cay Fanduco, terminates at Varas Point. The inhabitants in this locality subsist chiefly on fish; boats leave here during the season for the turtle fisheries of Mona Island.

Boqueron Bay.—About 2 miles from Port Real is Guaniquilla Point and between it and that of Melones, 2½ miles farther on, is Boqueron Bay. It is obstructed by numerous shoals both within and without. It may be entered by two channels, having not less than 4 fathoms water, which lead into a spacious and sheltered anchorage.

Boqueron Bay appears to be the line of separation as regards the

climate and productions of Puerto Rico. On the north side, where there is an abundant rainfall, the country is fertile, covered with trees and rich pasture lands, where cattle feed. To the south, toward Point Melones, and having its rise there, is a chain of arid mountains without trees or pasture; an uninterrupted drought does not permit the growth of vegetation on this side, but it will be seen from the following description that the shoals off this end of Puerto Rico, between Mayaguez and Cape Rojo, are so numerous and so imperfectly known as to render it not only difficult but dangerous to approach either of the above places.

Negro Shoal is of small extent, and almost always breaks. It lies 3½ miles from the nearest part of the shore, with Guanajibo Point bearing N. 85° E. (N. 85° E. mag.), and Jiguero Point N. 8° W. (N. 8° W. mag.).

Media Luna Shoal is said to be a reef ⅔ mile long and about 400 yards wide. The sea sometimes breaks upon it. From its north end, Guanajibo Point is said to bear N. 62° E. (N. 62° E. mag.) and Jiguero Point N. 6° E. (N. 6° E. mag.); ½ mile east of it are said to be three rocks on which the sea breaks constantly, but the existence of both shoal and rocks is very doubtful.

Las Coronas are sand banks about ½ mile in extent, which just cover, and sometimes break. They lie to the southward of Negro shoal, with Guanajibo Point bearing N. 37° E. (N. 37° E. mag.), and Jiguero Point N. 3° W. (N. 3° W. mag.) 3½ miles from the coast.

Guaniquilla Shoal is not marked on the Spanish chart, but is said to lie 2 miles westward of Guaniquilla Point. It is a rocky ledge, 400 yards in extent, with 16 feet of water on it.

Gallardo Bank is also a rocky ledge, which lies nearly 6½ miles west of Melones Point. It is 600 yards in extent, and has 16 feet of water on it. Halfway between this bank and the shore another 16-foot shoal is shown on the charts.

Mount Atalaya is the highest and northernmost of two peaks at the western extreme of the chain of mountains which runs from east to west in the NW. part of the island. It has a noticeable appearance and forms an excellent landmark.

Cape Rojo, the SW. point of Puerto Rico, is a bold bluff sloping down from a hill with two peaks. Seen from the east or west it has the appearance of two small islands close to highland. When seen from the southward two remarkable bluffs are seen to the eastward of it.

A good fishing bank of clear white sand and coral, called the White Grounds, extends 8 or 9 miles from the cape, on which the depths are from 6 to 15 fathoms; the edge is very steep-to, and the bottom is visible in 12 or 13 fathoms.

Light.—A lighthouse is erected on Cape Rojo, from which, at an elevation of 128 feet above the sea, a white light revolving every minute is exhibited, visible 18 miles; the building is hexagonal in shape. The light has been reported irregular.

The South Coast of Puerto Rico is generally foul, and should be very guardedly approached, for we possess very little correct information respecting it. It appears, however, that in some parts soundings extend to a considerable distance from the shore, and the lead should, therefore, be well attended. In running down, it is advisable not to come within 4 or 5 miles of the land. From the offing, this side of the island appears lofty, but the shore is generally low and bounded by mangroves. Sixteen small rivers empty themselves into the sea from this shore, but few are capable of admitting even boats. There are many small harbors and anchorages under the reefs, known to the fishermen and droghers, and one or two capable of receiving vessels of a large draft. The south coast of Puerto Rico, Lieut. Zuloaga remarks, is incorrectly shown on the existing charts, and should not be approached within a distance of 6 or 7 miles without great caution.

From Corcho Point, one mile SW. of Cape Mala Pascua, the coast curves to the northward and westward, then to the southward, forming a bay into which the Guardawaya River empties. Point Viento forms the western limits of this bay and the eastern limit of the bay of Patillas, the western limit of the latter bay being Point Figuera. No accurate information can be given with regard to these bays, but they are believed to be more or less obstructed by reefs.

Port Patillas in Patillas Bay is situated about 3 miles inland on the left bank of the Chiquito River.

Guayama Reef.—Its outside edge is at an average distance of 3½ miles from the shore. It is divided into three parts, the eastern being named Media Luna, the middle Algarrobo, and the western Ola Grande.

Vessels sailing along this part of the coast are cautioned to keep well outside of this reef.

Arroyo is a small bay immediately westward of Point Figuera. It can be easily recognized by the village of Arroyo, lying 3 or 4 miles inland and visible 12 or 15 miles. There is a white church on a little hill above the village, having on its western end a square tower and a cupola on the eastern end.

The United States is represented by a consular agent.

Anchorage.—The anchorage may also be recognized by the customhouse, a large yellow building. To enter the port, bring the customhouse to bear N. 11° W. (N. 10° W. mag.) and steer it on this course to avoid a bank, with 3½ fathoms of water on it, lying 3 miles southward of the bay. This bank is a spit running off from the eastern reef, and will be cleared by keeping the middle of the village of Arroyo bearing N 22° E. (N. 23° E. mag.).

A good berth is ¾ mile off shore, with the customhouse bearing north (N. 1° E. mag.). This anchorage is not all well sheltered, and a constant SE. swell is felt, and vessels anchor with port anchor with a spring in the cable, or run a kedge to keep head to the swell.

Port Charges.—Vessels calling in ballast pay captain of the port pilotage, $10; health visit, according to tonnage, $10 to $15; inter-

preter $4; stamped paper, if the vessel takes cargo, $10; customhouse fees, $4; tonnage dues, $1 per ton.

Guayama, although merely an open roadstead, is secure with the ordinary winds and much frequented. The anchorage possesses excellent holding ground and is protected to the eastward against the trade winds by a reef, 3 miles in length, which extends between 3 and 4 miles from the shore. It lies about 12 miles westward of Cape Mala Pascua, and may be recognized from an offing outside the reef by a guardhouse on the shore, which bears about N. 10° E. (N. 11° E. mag.) of the west end of the reef, and a windmill on a hill a mile to the westward of it. To the eastward of the reef, between it and the cape, the depth is from 10 to 7 fathoms at 2 or 3 miles from the shore, and 13 fathoms at a mile outside to the southward of it. As the anchorage is approached the soundings become very irregular, varying from 5 to 8 fathoms until within the reef, when they gradually decrease as the shore is neared; the lead must therefore be well attended.

Directions.—When approaching Guayama roadstead from the eastward—or indeed if bound to either of the ports on this side of the island from that quarter—Cape Mala Pascua should be given a berth of 4 miles, and when it bears to the eastward of N. 1° W. (north mag.) the Guayama Reef will generally come in sight from aloft. Shape the course to pass well outside, paying attention to the lead, and when the guardhouse bears N. 10° E. (N. 11° E. mag.) haul in towards it, under the west end of the reef, and steer boldly in. The church kept open a little eastward of a prominent hill in the interior is a good course in. The best anchorage will be found in 4 fathoms water, about a mile from the shore, with the guardhouse on the same bearing, and the west end of the reef S. 12° E. (S. 11° E. mag.). In leaving the bay, if bound westerly, steer out S. 22° W. (S. 23° W. mag.), but a good offing must be obtained before bearing up, in order to avoid the cays and reefs to the westward. The whole coast line of the bay is wrongly charted and the shoals are farther from shore than shown.

Vessels when passing along the south coast of Puerto Rico and in the vicinity of Arroyo Bay should exercise great caution, in order to avoid the dangers fringing the shore.

Port Jobos or Boca del Infierno.—About one mile to the westward of Port Guayama a narrow peninsula runs to the westward for 3 miles, which, with a couple of islands lying off its western end, forms Port Jobos or Boca del Infierno. No trustworthy information is attainable with regard to this port. Several small streams from the hills inland lose themselves in the swamp at the head of the bay, none of them emptying directly into the sea. The port is formed between Pozuelo Point on the east and Colchones Point on the west.

Port Aguirre is at the head of the bay between Colchones and Arenas Points.

Port Salinas de Coamo is well sheltered by reefs. The entrance may be easily distinguished by several cays lying near Arenas Point

and a guardhouse about 4 miles to the northward of the western cay. The channel lies between this western cay and a reef 1½ miles west of it, on which the sea always breaks.

Coming from the eastward, after bringing Cape Mala Pascua to bear north, distant 4 miles, the course will be S. 84° W. (S. 84° W. mag.), which will carry a vessel outside all the cays lying along shore.

Steer boldly in between the outer or westernmost of the cays lying off Arenas Point and the reef 1½ miles to the westward, passing the cay at a distance of 200 yards. Stand in toward the guardhouse and anchor with it bearing N. 6° E. (N. 6° E. mag.) about one mile distant, in 4 or 5 fathoms of water.

Discolored water extends for some distance to the southward of the cays. Three miles off shore the depth is 10 fathoms, decreasing to 7 fathoms as the coast is approached.

In leaving this harbor a vessel should, if bound to the westward, stand to the southward until Muertos Island bears to the northward of west (west mag.) before keeping away.

Nina Shoal.—Within the harbor is a rocky shoal, with 16½ feet on it, with 22 feet all around.

Water.—There is a good watering place in Port Salinas de Coamo on the shore near a lagoon, about ½ mile to the westward of the guardhouse.

Coamo Bay.—Its shore is skirted by reefs throughout its length. The River Coamo empties into the bay. Near Coamo Point are several small cays, and 2 miles to the southward are the Berberia Cays, with dangerous banks near them. Petrona Point is the eastern extremity of the bay.

Boca Chica.—The reef continues to the westward around Point Coamo as far as Port Pastillo. Boca Chica is a small trading place, and the approach to it is said to be clear of dangers. Soundings should be carefully attended to.

Port Jacagua is situated at the mouth of the small river of the same name, 1½ miles west of Boca Chica. To the westward of the mouth of the river are two small cays, called the Frios. This port is said to be easy of access, but we can give no exact directions. As the soundings diminish regularly from 6½ to 3½ fathoms in approaching the shore here, the lead will be a good guide.

Muertos or Dead Chest Island lies 4 miles off the south coast of Puerto Rico and nearly midway between the SW. and SE. points of the island. The southern part of the island is high and rocky, sloping toward the north, and from a distance looks like a separate island. The island is nearly connected to the coast of Puerto Rico by a reef extending from its NE. point, on which the sea generally breaks heavily. This reef seems to skirt the east and south sides of the island. In the latter direction it extends ½ mile offshore. At about 200 yards distance from the SW. end of the island there is a small flat rock, called

the Hammock, with a dry reef between them. The Hammock should not be rounded nearer than 1½ miles. Four hundred yards southwestward of the Hammock there is said to be a rock with 8 feet on it.

Water can be obtained on Dead Chest Island by digging wells a little above high-water mark. Turtles are plenty in the proper season, and the neighboring banks abound with fish.

Anchorage.—The western side of Muertos Island is free of danger, and affords fair anchorage in from 7 to 12 fathoms water. A good berth may be taken with the NW. point of Muertos in one with the northern hill bearing east (east mag.), in 8 fathoms, sand, at about ½ mile from the shore; or with the western extreme of Hammock Cay S. 20° E. (S. 20° E. mag.), distant 1½ miles, and the north point of Muertos N. 50° E. (N. 50° E. mag.).

Light.—From a tower standing in the middle of a T-shaped building on the SW. point of Muertos Island a light is shown at an elevation of 297 feet and should be visible 18 miles. A flash of three seconds duration is shown every three minutes.

Berberia Cays.—Three miles N. 67° E. (N. 67° E. mag.) from Muertos Island are two cays named Berberia, and in their neighborhood are many dangerous banks, very imperfectly known. With the island bearing west, distant 3 or 4 miles, the depth is 6 fathoms. From the hills white water is seen a considerable distance to the eastward; the lead must, therefore, be well attended. The cays are joined by a reef. From the larger and northern cay a shoal of considerable size extends NW. and SW., on which there is only 6 feet water. These two cays are often submerged, and are dangerous to approach on the west and south sides; but to the northward of the larger there is good anchorage in 4½ to 7 fathoms, mud.

There is said to be a clear channel north of Berberia Cays with 5½ fathoms least water.

Great caution must be observed by the navigator in this vicinity.

The Bay of Ponce is nearly 3 miles across between Carenero, the eastern, and Cucharros, the western point; the port is in the NE. corner of the bay, and on its shore is the village of Port Ponce, containing 1,500 inhabitants. The customhouse, a long, white, two-storied building, with flat roof and flagstaff, is the most prominent object in the village, and is very conspicuous from seaward. The shores are low and bounded by mangrove and cocoanut trees, but 2 or 3 miles westward of Cucharros Point the land rises and becomes hilly. Ratones Island is low and covered with brushwood; its surrounding reef, which nearly dries at low water, stretches off southeastward for 600 yards. Arenas Cay is small and bushy.

Cardones Island is low, covered with brushwood, and in its center is a wooden house. A reef surrounds the island to the distance of about 400 yards.

Light.—There is a fixed red light on Cardones Island, elevated 46 feet above the sea, and it should be visible in clear weather from a distance of 10 miles.

The lighthouse, 39 feet high, consists of a cylindrical tower with a red cupola rising above a rectangular building, which is white in color with blue panels.

Cayito Reef is a dangerous coral bank which seldom breaks. There are 9 feet on its eastern edge, and probably shoaler water will be found; a white chimney open eastward of the negro huts, near the cocoanut grove on the north side of the bay, bearing north (north mag.), clears the east side of the bank. There is a 7-fathom channel between Cardones Island and Cayito Reef, but it should not be taken without a pilot. The Gatas, four small low cays off Carenero, appear as a continuation of that point; its projecting reef, upon which the sea breaks, is steep-to. At the extremity of the reef off Peñoncillo Point northward of Carenero, are two small rocks which uncover 4 feet at low water. Cabrillon Point lies about ¾ mile eastward of Carenero Point; two small islets or cays lie off it.

Vessels approaching Port Ponce should not come within 5 miles of the land until the lighthouse bears N. 68° E. (N. 68° E. mag.), which should then be steered for, passing westward of Tasmanian Shoal. When abreast of Cardones Island, alter course to N. 11° E. (N. 11° E. mag.) for anchorage. The fore and main masts of a steamer wrecked on Tasmanian shoal show two-thirds above the water.

The Town of Ponce, the second in size, third in commercial importance in the island, and numbering 17,000 inhabitants, lies 3 miles northeastward of the port.

The city has a public hospital and is lighted with gas. It is connected with Jamaica by a telegraph cable, and also has telegraphic communication with the principal places on the island.

The law holds the masters of vessels responsible and liable to fines for any false declaration in contents, quantity, weight, or measure.

The United States is represented by a consular agent.

Supplies.—The supply of coal and wood is uncertain. Water is scarce and bad. Vessel's stores, being mostly imported, are high.

Port Charges.—Tonnage dues, $1 on each ton of cargo; health dues on vessels of 100 tons, $8, and $1 for each 50 tons in excess up to 450; $16 for all over 400 tons; pilotage in and out, $10; tug-boat charged by agreement; wharfage, for each lighter load of cargo, $1; sand, per lighter, $5; interpreter and duplicate manifest, $12; stamp paper, entrance and clearance, $10; fort pass, $2; hospital fee, $ taking in stone ballast, per ton, $1.50; sand ballast, per ton $1; balla guard, $1; hose hire for filling molasses casks, per puncheon, 6½ cent water delivered alongside, per puncheon, $1; labor, per day, $2; stevedore, per hogshead, 20 cents; coal, from $7 to $12 per ton. Cargo i handled by lighters. Vessels with clean bills of health are quarantine

for twenty-four hours; vessels from infected ports, from eight to forty days.

Harbor Rules.—No vessel is allowed to change her anchorage without permit from harbor master; fine for doing so equals double pilotage. All vessels from foreign ports are obliged to wait the sanitary and revenue visit. Vessels in quarantine will fly a quarantine flag. All boats must come alongside the wharf in front of the customhouse. No vessel can ballast or unballast without permission from the harbor master. Mineral coal is considered as ballast. No vessel can leave after sunset or before sunrise. Colored men as passengers or crew can not land.

Tasmanian Shoal (or Brillante), on which Tasmanian grounded, has 3½ to 5 fathoms of water over it; this shoal ground is nearly circular with a diameter of about 600 yards; as little as 13¾ feet have been reported on the east side of the shoal.

From the shoalest part, the center of Ratones Island is in line with a remarkable fall in the hills bearing N. 77° W. (N. 77° W. mag.), and a conspicuous clump of trees on the middle (the second) range of hills behind the town is in line with the east extreme of Ponce Village N. 11° E. (N. 11° E. mag.).

The conspicuous clump of trees in line with the house of the captain of the port (the house next west of the customhouse) bearing N. 14° E. (N. 14° E. mag) leads westward of the shoal. The saddle hill, nearly on the same line of bearing, and given as a leading mark on the chart, is not easily distinguishable.

Eastward of Tasmanian Shoal, ¼ mile distant, is another patch of shoal ground; this is about 400 yards in diameter, with 3¾ to 4½ fathoms water on it. There is a depth of 6½ fathoms between the two shoals.

Directions.—Shoal and uneven soundings exist southward of the bay for some distance from the shore, probably on irregular banks extending from Ratones Island on the westward and from Muertos Island on the eastward, leaving a deep channel between them into the port, eastward of Cardones Island. Approaching from the westward, the customhouse open of the east end of Cardones Island bearing N. 28° E. (N. 28° E. mag.) crosses the bank in 5½ fathoms, and on nearing Cardones, open the customhouse to N. 17° E. (N. 17° E. mag.). From eastward, round Hammock Cay, at the distance of 1½ miles, and steer N. 59° W. (N. 59° W. mag.); on nearing the port the shipping and upper part of the customhouse will be seen over the low mangrove trees, and small vessels may cross in 4 fathoms water, with the customhouse in line with the west end of Gatas Islets. Large ships should bring the customhouse to bear N. 17° E. (N. 17° E. mag.), on which bearing the least water will be 13 fathoms, and when abreast of Gatas steer north (north mag.) to the anchorage. The edge of the bank is 1½ miles southward of Cardones Island. Pilots can always be obtained, but they only board vessels when off Cardones. The land breeze often sets out between sunset and sunrise.

Tides.—It is high water, full and change, in Ponce Harbor at 2h. 0m. (approx.) and the rise 2 feet, but they are very irregular.

Port Matansa is a small bay open to the southward. The River Peñuelas empties into it. Ratones Island serves as a mark to the entrance to this port. From Port Matansa the coast trends SW. to Guayanilla Point, between which and Majagua Point is the Bay of Guayanilla. Near Guayanilla Point are several small islands. Majagua Point is skirted by a reef.

Port Guayanilla is a large bay almost circular, open to the southward. Several small rivers empty themselves in the bay. There is anchorage in this port in 5½ fathoms water; the entrance is open on a N. 11° W. (N. 11° W. mag.) bearing.

To the westward of the port the coast is foul.

The town of Guayanilla is situated on the banks of the river of the same name, about 1½ miles from the entrance.

Port Guanica.—This port is an inlet about 1½ miles in length in a NW. and SE. direction, and ¼ mile in breadth, with a depth of 3½ fathoms water at its inner end and 4¼ fathoms at its eastern, over a sandy bottom. It is the best harbor on this side of the island, and lies about 15 miles eastward of Cape Rojo. The depths in this port are shoaling on account of the alluvium carried down by the rains. A mudbank with a few scattered rocks extending from the north shore almost to the center of the port, has only 2 feet water.

Its entrance, formed between two bold headlands, Meseta Point on the east and Pescadores Point on the west, is little more than 200 yards wide, and is in the middle of a large bay formed between Brea Point, a bold and rocky cliff, and Picuda Point 3 miles eastward of it.

Close off Picuda Point are two small islets, called Caña and Caña Gorda. Between them and Meseta Point an unbroken semicircular reef sweeps round outwards to the distance of ¾ mile from the shore, and without this 800 yards off, there is a detached, narrow, rocky ledge 600 yards long in a north and south direction, with a depth of only 12 feet water on it. The south end of this ledge lies S. 23° E. (S. 23° E. mag.), a mile from Meseta Point, and on the line between Brea and Picuda Points. The western shore, between Pescadores and Brea Points, recedes into a deep bight, which is blocked up by a reef extending across from the former to within ¼ mile of the latter, and is steep-to.

Directions.—Approaching Port Guanica from the eastward, run down outside the reefs until Meseta Point is in line with the western pap of Cerro Gorda, which may be easily recognized. This mark w... lead in close alongside to the westward of the outer ledge in 10 fathom water. The point on with the eastern pap will lead more in mid-channel, and when Caña Gorda bears N. 84° E. (N. 84° E. mag.) a vess... may steer for the center of the channel into the harbor. Run boldly through between the entrance points, and take up the most convenient berth within, where there is nothing in the way. The SW. shore the boldest; but the farther a berth is chosen to the eastward, t...

easier it will be to sail out. In beating up from the westward, Brea Point may be passed at the distance of 200 yards, then steer for Point Meseta until the middle of the entrance bears north (north mag.) when stand in and anchor.

Coast.—From Brea Point a broad chain of reefs, known as the Margarita, extends as far as Cape Rojo; the south extreme of the reef extends fully 4 miles off shore, and forms a point to leeward of the village of Parguera. This chain of reefs affords three passages, which are only accessible to vessels of light draft and which no vessel should attempt without the aid of a pilot.

Terremoto Passage.—In the neighborhood of Salinas Bay, between Carcovado Point and Terremoto Cay (the largest of the outer cays), is Terremoto Passage, where the soundings are 4½ to 7 fathoms, and by which coasting vessels enter Salinas Bay.

Faluch or Middle Passage is near Cabras or Mateo Island, and has 9¾ fathoms of water. The eastern edge is marked by a small mangrove cay, from which a reef extends to the NW. Faluch Passage, the best of the three, leads to the port of Guijano, which is formed by the coast and an inner line of reefs, and has a depth of 7 to 9 fathoms. The port is spacious, deep, and sheltered from all seas.

Indio Passage, the western one, is about 4 miles westward of the Middle Passage. It is abreast of Pitajaya. It is about 400 yards broad and has 7 fathoms of water inside. Anchorage, sheltered from the sea, is found under the lee of the reefs.

Cape Rojo and light. Page 345.

Winds.—The winds around Puerto Rico appears to be of the same character as those met with at the Virgin Islands. There is no regular land breeze to take advantage of, although the usual trade wind generally slackens during the night in the immediate vicinity of the shore. Under the west end, the wind in the day time will incline inward. In the winter months north and NW. winds sometimes occur, and blow hard; and in the summer, long calms and light SE. airs prevail, with terrific squalls and heavy rains, especially on the south side. From the absence of any remarks on the rollers we may conclude that they are at least not so heavy or so dangerous as at the Virgin Islands.

Currents.—On the north side of Puerto Rico, the current is said to incline generally to the SW. or towards the shore, and to run with greater velocity in the winter than in the summer months. On the south side its course is generally west, but its movements are here uncertain. Some navigators state that at the full and change of the moon a strong weatherly set will occasionally be found, especially if light winds or Northers have prevailed near these periods, and consequently gives great assistance to vessels beating to windward. In February it has been found running a knot an hour to the northward; in the summer months it will incline to the NW. towards the shore, and round the SW. end into the Mona Passage with great force.

CHAPTER XI.

THE VIRGIN ISLANDS.

Virgin Islands.—The line of demarcation between the English and Danish Islands runs from the north between Little Tobago and Hans Lollik; from thence to the ESE. midway in the channel between Thatch Island, Tortola, and St. John, round the east end of the latter, and from thence to the south through the Flanagan Passage.

The majority of the islets which lie off the larger islands are barren and of no value.

The only islands of any commercial importance are Virgin Gorda, Tortola, St. John, St. Thomas, and St. Croix.

The island of Anegada only merits description on account of the reefs which surround it, where many vessels have been wrecked.

On making the Virgin Islands from the northward, Virgin Gorda will be seen on the extreme left, rising in a clear, well-defined peak. Anegada being only 30 feet above the sea, will not be seen more than 5 or 6 miles from an elevation of 10 feet. Next to Virgin Gorda, Tortula will appear the most conspicuous; Sage Mountain, the highest in the island, does not rise in a peak from this direction, but appears flattened and elongated. Immediately to the right or to the westward of it will be seen the rugged pointed peaks of Jost Van Dyke, and behind them the irregular small peaks rising from the table-land of St. John and varying in elevation from 800 to 1,225 feet.

If on or near the meridian of 64° 50′ W., and about 20 miles to the northward of the islands, a separation will be observed between St. John and St. Thomas, as the small cays which lie off and between them will not be above the horizon, while Virgin Gorda, Tortola, Jost Van Dyke, and St. John will seem to form one large island, the prominent peaks on each being alone distinguishable.

The island of St. Thomas may be recognized by having a large saddle on its center, formed by Signal Hill and West Mountain, and the isl is less rugged in outline than the others. The saddle is equally spicuous from the southward. Culebra, from the above meridian, be only just in sight. Its hills are more rounded than the others much less elevated. From hence also, in clear weather, El Yunqu Anvil Peak, on the Sierra Luquillo, at the east end of Puerto Rico, be seen.

Tides.—The phenomena of the tides among the Virgin Islands, although of the highest importance to navigators, are extremely difficult of explanation. The following rule is given by the fishermen, and, in general, it may be safely adopted: From the moon's rising until her meridian passage, the flood runs to the southeastward, or to windward; and from thence to her setting the ebb runs to the northwestward, or to leeward, and *vice versa* with the lower transit; hence there is a six-hours' stream each way. This rule, however, is greatly interfered with in different localities, as will be seen hereafter, and by the force and direction of the wind.

It is observed that the southern tide predominates during the summer months, from the middle of June to the middle of August, and two tides have been then known to follow in succession, particularly if the wind has been westerly; and on such occasions the perpendicular rise was increased by 2 feet. Near the commencement of this remarkable change the stream is observed to set for eight or ten days continually to the southward with a force seldom surpassed, and is called by the fishermen St. John's tide, from its occurring near the day of that saint. For the remainder of the above period, the ebb or northerly stream will run only for about one or two hours.

During the months of September, November, March, and April the northern tide prevails, and with considerable force, being assisted by the current. At this period also the highest water is generally in the morning, and there is only a half-tide in the evening; the reverse takes place during the summer months. The establishment for high water at full and change appears to be about 9h. 0m., but it is liable to great uncertainly, for sometimes it is as early as 7h. 0m. The rise and fall at springs is from one to 1½ feet; but in the months of April and May the mean level of the sea is observed to be a foot lower than at other periods, which agrees with the observations of Dr. Fahlberg. The duration of the stream (as before stated) is six hours each way, and to which the stranger must pay strict attention, leaving the time of high water as a thing altogether of minor importance.

As already observed, the northern stream is called the flood, and that coming from the southward the ebb; strictly, however, this may be an error, although not of much consequence, for the change of set takes place at about half-tide on the shore, and, the rise and fall being so small, it is difficult to say to which set the term "flood" should be applied.

It happens, however, that the commencement of the flood stream kes place at full and change, at about 6h. 0m., and as it runs for six ours and then changes to the ebb, by remembering this establishment r the first beginning of the flood, the turn of tide can of course be alculated for any intermediate day during the lunation.

As 6h. 0m. happens to be nearly the time of the moon's rising at full d change, we have the fisherman's rule explained.

Soundings.—The Virgin Islands lie on the southern edge of an extensive bank of soundings. NW. of Anegada, the bank is said to be extending, on account of the loose sand and strong current.

The soundings on the south side of the islands differ in a remarkable manner from those on the north. Here the edge of the bank, bold and wall-sided, lies at the distance of only from one to 7 miles from the cays, and close within it is a narrow ledge of coral, about 200 yards wide, with a depth of from 15 to 19 fathoms, which continues unbroken from the Horseshoe Reef at Anegada nearly to Crab Island, having immediately within it from 25 to 30 fathoms water.

The general depth on the north side of the islands is from 28 to 30 fathoms, coral sand, with rocky patches from ½ mile to 4 miles in extent, on which the soundings vary from 6 to 15 and 20 fathoms. These patches lie from 2 to 7 miles from the edge of the bank. Eastward of 64° 40′ W. the depth is from 15 to 22 fathoms, shoaling to 7 fathoms on nearing the west end of Anegada.

Whale Bank is the most northern of these patches, and has 10 fathoms water on it, coral rock. Irregular soundings extend nearly 4 miles to the northward, varying from 12 to 20 fathoms. A mile southward of the bank there are 25 fathoms, and east and west of it shoal water extends for nearly a mile.

Turtle Head is a small coral patch lying SW. of the Whale, with as little as 6 fathoms water on it. A quarter of a mile northward there is a depth of 25 fathoms, whilst to the southward uneven ground extends nearly 1½ miles, with soundings of from 11 to 18 fathoms. When on the head the west end of Jost Van Dyke will be seen in one with the westernmost hill on St. John bearing S. 1° W. (south mag.).

Barracouta Banks are several patches with from 11 to 20 fathoms water on them, and lie from 2 to 4 miles from the edge of the bank, the shoalest parts being at their NE. and NW. ends.

Kingfish Banks are two coral patches, each about a mile long and ½ mile wide, with 8 fathoms water on them. They are one mile apart, with a depth of 23 fathoms between.

With the exception of some rocky patches, having about 18 fathoms water on them, the above are the only offlying shoals on the north side of the group.

Anegada or Drowned Island is covered with brushwood. Until the establishment of the lighthouse on Sombrero Island numerous vessels were wrecked on this island and the dangerous reefs which surround it. Now the landfall sought by vessels from the northw[illegible] is Sombrero lighthouse, from which an accurate departure can be tal[illegible] making the Anegada Channel, once so famous for its dangers, perfe[illegible] safe with ordinary care and attention.

The island is 9 miles in length ESE. and WNW., and from one [illegible] miles in breadth, almost uniformly about 30 feet high, and covered [illegible] brushwood, excepting in a few spots which are cleared for the cultiva[illegible]

of corn and vegetables. A large portion of the interior is cut up by extensive salt water lagoons, hence its name. The principal settlement is on the south side, 6 miles from the west end.

Fresh water may be obtained by digging wells in the sand, particularly near the beach at the west end of the island, but the inhabitants prefer drinking the rain water caught in the natural cisterns formed in the rock.

Horseshoe Reef.—The island of Anegada is skirted on its outer or northern side by a narrow frontier reef to the distance of from 200 yards at its extreme north point to 1½ miles at its east end; thence a most dangerous broken reef extends SE. by S. for 7 miles, upon which most of the wrecks occur. This portion is called the Horseshoe Reef, and from its south end detached coral heads and shallow ledges extend 4½ miles SW. by S., where they terminate at the Herman Reefs, on which the sea generally breaks.

Two miles S. 67° W. (S. 68° W. mag.) of the southeastern pitch of the Horseshoe Reef is a heap of dead white coral, 3 feet out of water, called the White Horse; 2½ miles to the eastward of the pitch end there are 34 fathoms on the edge of soundings, and within a mile of it there are 10 fathoms. Abreast the Herman Reefs the edge of soundings is little more than a mile distant, which makes them still more dangerous.

Robert Reef is a small rocky patch with 4½ fathoms water on it lying 3½ miles within or to the westward of the Herman.

At 1¼ miles to the NE. of this reef there is also a small rocky head with 4 fathoms on it.

Hawksbill Bank is a small rocky ledge, on which there are from 3 to 5 fathoms, lying about 2 miles to the N. 23° W. (N. 22° W. mag.) of Robert Reef. These patches should be avoided when anchoring under the lee of Horseshoe Reef. The water is, however, so clear that the bottom may be seen distinctly in 8 or 9 fathoms.

Currents.—After SE. or southerly winds, which blow at times throughout the year, but are most frequent in May or June, a NW. current of sometimes a mile an hour runs along the reefs. For this reason especially vessels bound from the northward through the Anegada Passage should not fail to sight, by night or day, Sombrero lighthouse.

Caution.—The edge of soundings is so near the reef that the lead is not a trustworthy warning of the approach to danger, and therefore a sailing vessel bound to the southward and having a head wind in this hannel should not approach these reefs nearer than 10 miles, but should ork to the southward in the eastern part of the channel till past all nger.

The Rollers, or Ground Swell, frequently occur from October to ay, and continue sometimes three or four days. In general, they set after a prevalence of light east or SE. winds. Between Tortola and ano Islands they have been seen to top and break in 9 fathoms, and the SW. side of Anegada, in 4½ fathoms, anchors are sometimes

lifted; it is consequently dangerous for sailing vessels to come too near any part of the northern shores of the Virgin Islands, for they get up suddenly, and during their continuance the wind is too light to keep a vessel under command. They appear to have great influence on the bottom in loosening the sand and in discoloring the water for some miles to the northward of the islands, as far as the edge of the bank. In some places near the west end of Anegada, where the bottom is composed of very fine sand, the formation of the banks is frequently changed.

Anchorage.—There is good temporary anchorage off the west end of the island in from 5 to 6 fathoms water, at about a mile distant. It will not be prudent, however, to remain here any time during the period of the rollers, which frequently occur from October to May; but it will be better during this season to anchor well under the south side of the island if intending to remain the night.

The best anchorage will be found in 6 fathoms, with the west end bearing N. 21° W. (N. 20° W. mag.), the cocoanut trees at the settlement at Pearl Point N. 33° E. (N. 34° E. mag.), and the east point N. 69° E. (N. 70° E. mag.). Great care, however, must be taken not to haul up too suddenly after rounding the west end and not to come within the depth of 5 fathoms. Great attention must be paid to the lead after passing within the 10-fathom line.

The bank to the westward of the meridian of Anegada is composed chiefly of fine sand, and in light weather vessels may anchor on it in safety with a kedge or stream, taking care, however, to avoid the rocky banks already described.

Virgin Gorda, the easternmost of the Virgin Islands, is easily distinguished by its rising gradually to a peak 1,370 feet high. It is sometimes called Peniston, or Spanish Town. The inhabitants are few in number, and are principally employed in raising fruit and vegetables and burning charcoal for the markets of St. Thomas and St. Croix.

The outline of the island is exceedingly irregular.

The center portion is occupied by the immense hill, the summit of which named Virgin Peak, has been already described. From thence the east end of the island is a narrow strip of land composed of irregular rugged hills, terminating at Pajaros Point in a remarkable pinnacle rock 120 feet high. The southern portion is more regular in outline, and nearly separated from the center by a small isthmus.

The most remarkable feature of Virgin Gorda is on its western side, between Colison Point and the south end of the island. The eastern side of this peninsula has been broken up by some violent action nature into immense granite blocks, which lie scattered about the shore.

The cays and islets to the southward as far as Round Rock are composed of the same kind of rock, and the largest (which lies ne ½ mile from the south end of the island), from its having the app ance of a town in ruins, is named Fallen Jerusalem.

Many of these blocks are 60 to 70 feet square; some are merely confined in their places by the weight of others leaning on them; and many, with deep rents and fissures in their sides, appear ready to fall by the slightest shock. In one or two places the sea finds its way through the crevices and forms beautiful natural baths. It is also a curious circumstance that similar granite blocks are found scattered about on Beef Island, on the opposite side of Sir Francis Drake Channel, and nowhere else. The island is badly watered.

Anchorage.—There are two excellent anchorages on the western side of Virgin Gorda. The water is smooth at both anchorages, except at the season of rollers, and the holding ground good, and they can easily be reached from either north or south.

Necker Island.—On the north side of Virgin Gorda there are several small slightly wooded cays and islets, the outer or northernmost of which is Necker Island, lying about 2½ miles from Pajaros Point. It is nearly ½ mile long, north and south, and about ¼ mile wide, and toward its north end it is 110 feet high; its SE. side is low and sandy. Toward the north it is bold and steep-to, there being from 6 to 10 fathoms water within 300 yards; but on the east and west sides it is foul and dangerous to the distance of nearly ½ mile. From the south side a broken reef extends off nearly ¼ mile leaving a clear channel, named Virgin Sound, with 9 fathoms water in it, and ¼ mile wide between the broken reef and the reefs from the islets to the southward; but the channel can only be navigated by small vessels.

The Invisibles are two small rocky heads with only 3 feet water on them and do not always break. They lie S. 74° E. (S. 73° E. mag.) ¾ mile from the NE. point of Necker; between them and the reef on the east side of Necker the depths are from 4 to 8 fathoms, but on their north and east sides there are from 10 to 11 fathoms almost alongside, and to the distance of a mile off.

Eustatia is a small islet, 170 feet high, lying ¾ mile to the southward of Necker, and nearly ½ mile from the nearest part of Virgin Gorda. Its north side is foul to the distance of 200 yards, and thence a broken reef extends on almost a straight line along the shore to Pajaros Point, under the lee of which, in Eustatia Sound, there is a small safe anchorage for droghers. The entrance is through a very small cut in the reef, about ½ mile eastward of the islet; but this part of Virgin Gorda should be avoided by strangers, as the ground is foul for some distance outside the cut.

Prickly Pear, the largest of these islets, is a mile in length NW. and SE., about ¼ mile in breadth, and 230 feet high. Its east end is not quite ¼ mile from the nearest part of a small peninsula of Virgin Gorda, and in the space between is the Saba Rock, 25 feet high. From the west end, the Cactus, a dry and broken reef, runs off 300 yards in that direction. The north side is bold, and between it and Necker there is good temporary anchorage in 7 or 8 fathoms water in Virgin

Sound, but care must be taken to avoid the foul ground to the SW. of the latter island.

Mosquito Island, the highest of the islets off the north shore of Virgin Gorda, lies nearly a mile westward of Prickly Pear. From its north end, small detached rugged rocks extend off 300 yards, the outer one, Mosquito Rock, being 24 feet high. From it the Colquhoun Reef (dry in most places) extends to the SE. about ½ mile, and is bold and steep-to outside.

Gorda Sound is an excellent and capacious harbor, 1¾ miles long east and west, and ¾ broad, with an average depth of 11 fathoms over sand and mud; sheltered from all winds, and protected from the rollers. A vessel may refit with great ease and convenience, under the lee of Vixen Point, the south end of Prickly Pear Island, and encamp the crew on the island if necessary. Biras Creek at the SE. corner of the sound, might be made available for heaving down with very little trouble.

The entrance to the sound lies between the ends of the Cactus and Colquhoun reefs, which are ¼ mile apart.

Beacons.—Two pole beacons surmounted by a triangle painted white, serve as a leading mark for entering. The front beacon is on Gnat Point; the rear beacon is 220 yards eastward of the eastward point of Gun Creek. These beacons in line, bearing south (S. 1° W. mag.), lead in 27 feet least water between the reefs.

Directions.—Vessels coming from the eastward intending to visit Gorda Sound, or with a view of passing out to the westward of Anegada, or to enter Sir Francis Drake Channel by the northern route, on their way to either of the ports to leeward, must approach Virgin Gorda with extreme caution, especially in the night, to avoid falling on the Horseshoe Reef. In the daytime the peak of Virgin Gorda will be a guide, as it is seldom clouded and may be seen 30 miles off. In the night, the latitude must be continually observed; and if the weather is not sufficiently clear for that purpose, and the longitude uncertain, do not by any means attempt to make the land, high as it is. Sombrero light should be made from the northward or eastward before attempting any of the channels.

If coming from the northward, the parallel of Anegada should on no account be passed in the night. If the island is made (or Virgin Gorda, which will be seen first), on a southerly bearing, it will be better to run to the westward of Anegada, and haul up for either of the passages most convenient; a vessel will always have a free wind for this purpose. It will be far safer to act thus than to attempt to pass to windward of the Horseshoe Reef, which has been the cause of so many disasters.

Vessels bound to St. Thomas are tempted to run this risk in order to save perhaps two days, by having to beat up on the south side of the island; but the latest surveys and these directions will show that there is no necessity for running to leeward round the west end of St. Thomas

and that having passed the west end of Anegada, most of the northern channels may be safely and freely navigated without loss of time, and with the saving of much risk and anxiety.

Coming from windward, bring Virgin Gorda on a S. 83° W. (S. 84° W. mag.) bearing and run down on this course. When within 7 or 8 miles of Pajaros Point, Necker Island will come in sight and may be boldly steered for, taking care not to bring it to the westward of N. 83° W. (N. 82° W. mag.) in order to avoid the Herman Reefs. When Pajaros Point bears S. 44° W. (S. 45° W. mag.), distant about 1½ miles, haul up N. 46° W. (N. 45° W. mag.) to avoid the Invisibles, which are not seen until close upon them. Continue on this course until the land to the westward (which will be the north end of the Guano Island, touching the right extreme of Jost Van Dyke) begins to open of Necker, bearing S. 75° W. (S. 76° W. mag.), when a vessel may boldly keep away to the westward, in 10 and 11 fathoms water.

When abreast the spit of the Horseshoe Reef it may be distinctly seen from aloft, as it breaks in the finest weather; but the Herman Reefs only break with a swell or strong breeze, and the dry sand bore to the northward of them, being only 3 feet out of water, is scarcely visible at the former distance. Pajaros Point may be rounded at the distance of 400 yards.

If bound into Gorda Sound, having opened out the land as before directed, steer S. 89° W. (west. mag.) until the peak of Virgin Gorda bears S. 27° W. (S. 28° W. mag.), when haul in for the leading mark given above in the directions for the sound. Having entered the channel, when abreast of the SE. end of Colquhoun Reef, a vessel must haul to the wind, and a berth must be chosen as most convenient, in the eastern part of the sound.

Tides.—It is high water, full and change, in Gorda Sound at 8h. 30m., and the rise is about 1½ feet. The tides at the entrance of the sound, between the reefs, seldom run more than half a knot, and the flood sets toward Prickly Pear Island. Between Mosquito Island and Anguilla Point, south of it, the flood sets to the eastward at the rate of one and 1½ knots. Between Parajos Point and the Horseshoe Reef it seldom runs more than one knot, but its duration varies.

Anchorages.—There are two excellent anchorages for vessels of any draft under the western side of Virgin Gorda. The first is formed by an extensive bay between Mountain Point, the NW. end of the Island, and Colison Point, 3 miles from it, and is partially protected to the NW. by the Seal and Dog Islands. It seldom, however, blows hard to the westward of north, and the only thing to be prepared for is the ground well in the winter months. At this season it will be better to anchor in about 13 fathoms water, midway between Great Dog and Virgin Gorda, a mile from either; where with good ground tackling and a long scope of cable out there will be nothing to fear, as the rollers are seldom accompanied by much wind.

The southern anchorage between Colison Point and Fallen Jerusalem, 2½ miles to the southward of it, is the best, as, if necessary, vessels can weigh and run out to the westward with more ease than in the former. The holding ground is good at both places, and, except occasionally, the water is always smooth. There is a small head of 4¼ fathoms lying S. 89° W. (west mag.), 800 yards from Colison Point.

Directions.—To gain the western roads, either the northern or southern channels may be taken. The passages between the islets are all bold and free of danger, with the exception of that between Scrub and the Dog Islands, in which lies the Tow Rock with 15 feet water on it, and as it is only 20 yards in extent, it must be carefully approached.

It lies a little more than a mile N. 74° W. (N. 73° W. mag.) of the West Dog, and the best direction to give is to keep either Dog or Scrub Island close aboard, as they are bold and steep-to.

The Great, George, and West Dogs can not be mistaken, being three small islets, and the nearest to Virgin Gorda; the two eastern are 250 and 270 feet high, and the western 150 feet; 400 yards westward of the George or Northern Dog is the Cockroach Rock.

Seal Dogs are a cluster of three much smaller islets, lying close together, about 1½ miles from George Dog and one mile from Mountain Point, with clear channels on both sides. The northernmost islet is only 6 feet high, the others 74 and 100 feet.

Scrub Island, 450 feet high, lies westward 1¾ miles from the West Dog, and is the easternmost of the numerous small islets and rocks which lie close off the east end of Tortola, and which are only separated from each other by small, intricate cuts from 200 to 600 yards wide.

Among these islands, which do not need any further description, are Guano Island, Great and Little Camanoe Islands, Beef Island, Buck Island, and Marina Cay. Most of these are high, averaging from 500 to 650 feet, except Marina Cay, which is low.

On the chart an anchorage is marked west of Guano Island, but during the season of rollers it is unsafe, as they break here in 8 or 9 fathoms.

Southern Channels.—Between the south end of Virgin Gorda and the east end of St. John, about 14 miles distant, is a range of very remarkable small, rugged, and most irregularly shaped islets and rocks. Between most of them are deep and navigable passages leading into Sir Francis Drake Channel, simple and easy of access in the daytime. In the smaller ones, however, a little precaution is necessary in a sailing vessel to guard against the eddy tides and flaws of wind wl coming under the lee of the larger islands.

Round Rock is south of Fallen Jerusalem Cay, 220 feet high. tween them lie the Blinders and other barren rocks, and the ground rocky and foul in the cuts between them.

Ginger Island, SW. of Round Rock, is irregularly shaped. Betw these two islands is Round Rock Passage, the best channel for ves

coming from the eastward, as the small islands to windward are too small to obstruct the regular breeze, and the channel is easily recognized by the remarkable appearance of Fallen Jerusalem, a mile to the northward of it.

Both sides of the channel are bold and steep-to, and there is no danger whatever in it.

Between Ginger Island and Cooper Island, to the westward, the channel is ¾ mile wide.

Carval Rock is in the southern part of this channel. It is 110 feet high, bold and steep-to, and may be left on either hand.

Ginger Island is so high that a sailing vessel is very likely to be becalmed under its lee. For a steamer, or for a sailing vessel with a SE. breeze, this passage is as good as Round Rock Channel.

Cooper Rocks are in the northern part of this channel and just to the eastward of Cooper Island. The channel between, though deep, is too narrow to be used by a sailing vessel.

Salt Island.—Off its NE. point is a rock awash, between which and Cooper Island is a narrow channel, less than ¼ mile wide, and should not be attempted by a sailing vessel.

Dead Chest Island is a small islet 200 feet high, and a little more than ½ mile from it is Blonde Rock, with 12 feet of water on it. Between this danger and Salt Island is, however, a clear channel nearly a mile wide. To be sure of avoiding it, keep Salt Island close aboard.

Peter Island forms an elbow. The eastern part is 540 feet high, the northern part is 440 feet high. The channel between it and Norman Island, to the westward, is crooked and seldom used. Besides, it is obstructed at the southern entrance by the Carrot, a small patch with 10 feet of water on it, lying nearly ½ mile from the Carrot Rock (84 feet high) off the south end of Peter Island. It had better, therefore, be avoided altogether. These islands are inhabited by fishermen.

Great Harbor is a snug little bight on the north side of Peter Island, and may be entered without the slightest difficulty at any time. The water is deep close up to the shore, and it has excellent holding ground. The harbor is open to the NW., but Tortola protects it in that direction and makes it quite smooth.

Little Harbor, a short distance to leeward of Great Harbor, is of much the same character, but more confined and more open. There is no water on Peter Island. Both this island and Salt Island are inhabited by fishermen.

Norman Island is crooked, and 440 feet high in its western part. On the western side is a good anchorage in from 7 to 11 fathoms in a small inlet called the Bight. The shores on each side are steep-to, and the only danger to be avoided is Ringdove Rock. The mark to clear it is Treasure Point, in line with the summit of the western hill. There is a narrow but deep channel between Ringdove Rock and the northern point of the entrance.

Although the bight is open to the westward, it is sheltered in that direction by the island of St. John.

Privateer Bay.—There is good anchorage in this bay, just south of Treasure Point, with the regular trade wind.

Flanagan or Norman Pass.—This passage is the most difficult to enter from the southeastward, on account of the Santa Monica Rock, which lies right in the way. This rock is very small, with only 10 feet of water on it. Fort Charlotte, on Tortola, in one with the highest of the Indian Rocks, N. 2° E. (N. 3° E. mag.), leads to the eastward of it, and Bellevue, the highest hill on the east end of Tortola, in one with Indian Rocks, N. 17° E. (N. 18° E. mag.), leads to the westward.

The Indians are four remarkable small pinnacle rocks, 50 feet high, close together, at about 200 yards westward of a small islet 180 feet high named Pelican Island.

Directions.—When approaching Flanagan Passage from the eastward the best way will be to haul close round the west side of Norman Island, which may be done without fear at the distance of about 300 yards.

In beating up or running down along the shore, by keeping Cooper and Ginger Islands just open of Peter Island, a vessel will pass ½ mile to the southward of the Santa Monica Rock.

The mark for clearing Ringdove Rock also just clears the Indians.

Sir Francis Drake Channel lies between the islands just described on the south, and Tortola and the islands east of it on the north. It is clear of dangers except in the vicinity of Road Harbor, in the island of Tortola, where there are several shallow banks. In the other parts of the channel a vessel may anchor anywhere to the eastward of a line drawn from Buck Island to Dead Chest Island. The bottom is hard and thin and requires a good scope of cable.

With strong north and NE. winds there is a good anchorage on the SW. side of Beef Island.

Tortola Island is of a very irregular outline and is very mountainous. In 1885 the inhabitants numbered about 5,300, including a few persons on Beef, Guano, Camanoe, and Thatch Islands.

Road Harbor is on the SE. side of Tortola, and the only port of entry in the British portion of the Virgin Islands. Being completely exposed to the SE., it may be more properly described as a bay surrounded by an amphitheater of lofty hills, the spurs of which reach the edge of the shore, Mount Sage overlooking it on the west and Mount Bellevue on the east, the latter 1,270 feet high.

Vessels of large draft should not attempt to enter without a pilot.

Road Town, the seat of government, stands on the western shore of the harbor, and immediately above it a spur of the main ridge where Fort Charlotte formerly stood, but no part of it is now seen.

The flagstaff formerly used as a leading mark for entering is now placed in the center of the town, near the customhouse.

On the eastern side, immediately opposite, and scattered along the shore, is the village of Kingston.

The Anchorage is so confined by the numerous shoals at its entrance and within it, especially on the lee or western side, that it is only adapted for vessels of moderate draft, and it is very inconvenient, from the heavy swells which prevail in the winter season.

Under the lee of the reef at Fort Burt Point, on the western side of the entrance to the harbor, there is a small, well sheltered vein of deep water, which affords a good careening place for coasters of about 9 or 10 feet draft.

Denmark, Scotch, and Lark Banks.—There are from 2 to 6½ fathoms water on the Denmark Banks, the eastern extreme of which lies nearly midway between Hog and Slaney Points, the outer extremes of the harbor.

Inshore of the Denmark Banks, in the narrowest part of the entrance between Fort Burt Point and Kingston, are the Scotch and Lark Banks; the latter, which lies 400 yards eastward of the dry reef off Fort Burt Point, has only 2½ fathoms of water on it; the former is about 600 yards from the eastern shore, and has 2 fathoms on it.

Wickham and Little Wickham Cays are low, covered with mangrove bushes, and show well against the cultivated ground behind them; there are several large cocoanut trees on the SE. part of Wickham Cay.

Directions.—Having entered the harbor under easy sail, when Fort Burt Point bears S. 78° W. (S. 79° W. mag.) the vessel will be just within the shoals, and may then round-to and anchor in 10 fathoms, with Shirley Point bearing about N. 44° E. (N. 45° E. mag.), distant 400 yards, in from 7 to 13 fathoms water, very uneven bottom.

Handy vessels of light draft, or steamers, having brought Fort Burt Point on the above bearing, may haul up about N. 24° W. (N. 23° W. mag.), and proceed in so far as to bring the cocoanut trees on the SE. end of Wickham Cay to bear N. 80° W. (N. 79° W. mag.), taking care to anchor eastward of the line of the outer part of Slaney Point, touching the right extreme of Flanagan Island. They will here have room to weigh and avoid the harbor spit, which stretches out from the westward into nearly the middle of the anchorage.

Tides.—It is high water, full and change, in Road Harbor at 8h. 30m.; springs rise 1½ feet, and the lowest tides are in April and May.

Sea Cow Bay may be used as a temporary anchorage for small vessels.

Sopers Hole is a deep snug bight between Frenchman Cay and Little Thatch Island on the south and the western point of Tortola on the north side, and sheltered from westerly winds by Great Thatch Island. In the middle of the anchorage there are 12 fathoms, gradually decreasing to 6 fathoms close to shore.

Directions.—There are two passages by which Sopers Hole may be entered; one between the point, called the West End of Tortola, and

Little Thatch Island, and the other between the latter island and Frenchman Cay. If the first is taken, it should be approached by the Thatch Island Cut upon the flood, which will shoot a vessel into it, taking care to give the west point of Little Thatch Island a berth of 200 yards.

If coming from the eastward the latter passage will be the best, as a vessel will have a leading wind, and can luff up close under the west end of Frenchman Cay, which is steep-to, and shoot into the basin with either the flood or ebb.

Thatch Island Cut is the passage between Thatch Island and Tortola, and must not be attempted by a sailing vessel from the northward except with a flood tide, as the eddies and stream are very strong.

Great Thatch Island.—Its eastern point, forming the western side of Thatch Island Cut, is bold and steep-to.

Tides.—In the channel between St. John and Tortola the flood tide runs to the eastward and the ebb tide to the westward, with a velocity of from 3 to 4 knots.

Vessels should be prepared to meet the gusts and baffling winds which rush down through the valleys of Tortola.

Cane Garden Bay is the only anchorage on the north side of Tortola, where small vessels may find a temporary shelter. Across the entrance there is a bar with 12 feet of water. Inside of this bar there are 3 and 4 fathoms, within a reef which runs out from the south side of the bay. The small village of Cane Garden extends along the shore at the bottom of the bay.

St. John Island is of irregular breadth. Ram Head, a bold headland, forms the south point of the island; the western portion is composed of irregular hills and peaks. The spurs from the heights terminate abruptly at all the projecting points, and, with the exception of a small spot at Coral Bay, nothing is seen but hill and dale.

Coral Bay lies at the east end of the island, at the bottom of the deep bight just noticed. The eastern side is formed by a lofty promontory, which juts out to the SE., and terminates at Moors Point; thence to the nearest point of the shore westward the bight is 1¼ miles wide, and opens to the SE. The shore within this is cut up into three smaller bays, and in these again are several little creeks. The westernmost of the bays is called Coral Harbor, the middle one Hurricane Hole, and the eastern one Round Bay, which is immediately under the SW. side of the promontory.

There is no town or village in Coral Bay, but at Coral Harbor the Moravian missionaries have a little establishment called Carolina, from which place bridle paths lead to all parts of the island.

Large vessels seldom visit this bay, and the produce of the neighboring country is carried by coasters to St. Thomas and St. Croix.

About halfway between Ram Head and Moors Point is Buck Island, 84 feet high. There is a channel on both sides of it.

Eagle Shoal.—In using the channel to the westward, care must be taken to avoid this shoal.

The shoal consists of two patches of coral, about 40 yards each in diameter. The easternmost has only 3 feet, and the westernmost 12 feet of water upon it. They are steep-to, with from 6 to 7 fathoms all around them. To clear these patches to the southward, keep Buck Island open of Ram Head; or do not bring the Head to the southward of S. 89° W. (west mag.) until Turners Point, in the middle of Coral Bay, is well open eastward to Buck Islet, when stand in to either of the anchorages, keeping clear of the shoal patches off Round Bay.

Leaving the bay with a commanding breeze (not to the southward of east) a vessel may run through between Sabbat Point and Buck Islet, and to the leeward of the Eagle Shoal. In doing so, however, do not bring Sage Mountain in Tortola open eastward of the western hummock on Buck Islet, till clear of the Eagle Shoal, which is about ½ mile from the shore.

Hurricane Hole.—Of the three anchorages in Coral Bay this, being partly sheltered from SE. winds, is the best and safest. A good berth is in 11 fathoms of water with Turners Point bearing S. 52° E. (S. 51° E. mag.) and Harbor Point S. 78° W. (S. 79° W. mag.).

Round Bay.—The best anchorage is in 13 fathoms of water, with Moors Point bearing S. 63° E. (S. 62° E. mag.), 600 yards. As a temporary anchorage with the usual trade winds this is a good berth, but with a SE. wind it is very rough. There are several patches of 4 fathoms in the bay.

Coral Harbor—The anchorage here is smooth, with the ordinary winds, but being on a lee shore, and having a narrow entrance, only small fore-and-aft vessels can work out safely. After luffing up at the entrance, the wind becomes so baffling that a vessel will perhaps be obliged to anchor and warp, should she wish to go higher up.

Water, Otter, Princess, and Borck Creeks, in Coral Bay, are snug places for clearing out; the sandy points on the southern shores of the two former are very convenient for that purpose. In Water Creek a large vessel might heave down with safety, as there are from 15 to 20 feet water, close to the shore, or lie moored in perfect security during the hurricane months. Generally, in all these anchorages, the ground under 5 fathoms is rocky, but in deeper water it is sand and mud, and fair holding ground.

Water.—At the head of Coral Bay there is a well of excellent water convenient to get at; boats may lay alongside the wharf in smooth water and a good road enables the casks to be rolled up to it with little labor. Firewood is plentiful, but it is private property.

The Tides set across the mouth of Coral Bay; the flood to the SW. and the ebb to the NE. at the rate of ¾ mile an hour. There is no tidal stream within the bay, and the rise and fall of springs rarely exceeds one foot. The time of high water, full and change, varies from 1h. 0m. to 9h. 0m.

Great Lameshur Bay affords shelter for small vessels in 9 fathoms of water just under Cabrite Point.

Reef Bay, a little westward of Lameshur Bay, is easily distinguished by a remarkable white cliff, 135 feet high.

There is no shelter except for boats.

Fish Bay, westward of Reef Bay, is only 200 yards wide between the reefs at its entrance, but nearly 800 yards deep; within the bay the soundings gradually decrease from 4 fathoms to the shore.

Rendezvous Bay, to the westward of Dittless Point, is quite free of danger, but open to the southward.

Great Cruz Bay, at the SW. end of St. John, affords good shelter for droghers. From between the two bluffs at its entrance the water gradually decreases from 4 to 3 fathoms, and then suddenly to 2 fathoms.

Little Cruz Bay is a small cove at the western extremity of St. John, but only fit for coasters. There is a village on the shore, and a white building called the fort. An excellent road leads thence to the upper parts of the island and Coral Bay.

Anchorage.—To the westward of Little Cruz Bay there is anchorage in 11 fathoms water, over sand and mud, with the fort bearing S. 73° E. (S. 72° E. mag.), the center of the Two Brothers in one with the west point of Grass Cay; and the dry rocks off the east side of Meeren Cay in one with the Dog Rock.

Directions.—A vessel may approach this anchorage by the passage between Meeren Cay and St. John, but it can not be recommended to sailing vessels on account of the baffling winds under the high land. The best mark to run through it from the southward is the Carval Rock, off the east end of Congo Cay, and the western hummock on the west end of Jost Van Dyke in one, bearing N. 10° E. (N. 11° E. mag.).

Caution.—The reef off Turner Bay and the dry rocks off Meeren Cay are bold and steep-to; but care must be taken to guard against being set out of the course by the strong tide that runs at the rate of 2 knots between the islands and the main, the flood to the southward, the ebb to the northward. The best way, however, will be to pass to leeward of Meeren Cay, and to stand on until the vessel can fetch the anchorage.

Johnson Reef.—At 1¼ miles northward of Little Cruz Bay, and ¼ mile from Hogsnest Point, is the largest of the three Durloe Cays, 68 feet high; the other two cays, 45 and 18 feet high, are about 300 and 400 yards NE. and NW. of it. Nearly midway between these cays a[illegible] Whistling Cay, 250 feet high, is Johnson Reef. It is ¼ mile in leng lies ½ mile from the shore, and always breaks. There are 3½ fatho water 200 yards north of it, 3 fathoms at about the same distance e and west of it, and between it and the shore irregular soundings, va ing from 1½ to 10 fathoms.

Francis Bay, formed by Mary Point, and somewhat protected as round as NW. by Whistling Cay, affords good anchorage in 9 fatho

water, sand. Between Whistling Cay and the shore southward of it is a bank 800 yards in length and 250 in breadth, fronting the bay, with 3⅜ to 4½ fathoms water on it. The cut between Whistling Cay and the main is clear, but not easily navigated on account of the baffling winds from the high land forming Mary Point.

Leinster Bay.—On the northern shore, southward of Thatch Island cut, is an indentation of about ¾ mile in length and about ¼ mile deep. The western part of it, called Leinster Bay, is separated from Francis Bay by a narrow neck of land only 300 yards across, and the shore is here fringed with a coral ledge awash, easily seen. Its eastern part is named Smith Bay, where there is a small cay, called Watermelon, under which a vessel may anchor at about 200 yards from the shore. This cay is bold and steep-to, and is separated from the island by a channel 200 yards wide, carrying 12 feet water. A vessel must shoot up under its west side, and anchor midway between it and the beach to leeward, which is about 400 yards distant.

There are several other small bays on the northern side of St. John where small vessels may find shelter, but being exposed to the rollers they are not safe.

St. Thomas Island.—The island is mountainous, and in its general aspect much resembles St. John. A chain of mountains runs along the middle of the island, with spurs branching to the north and south, and terminating abruptly at the seashore. The two principal eminences are Signal Hill, nearly in the middle of the island, 1,500 feet high, and West Mountain, 1,550 feet high. The island is surrounded by small isles and rocks, which are almost universally steep-to, with very few hidden dangers.

St. Thomas Harbor, on the south side of the island, is excellently protected from all ordinary winds, and is perfectly easy of access. The town called Charlotte Amalia owes its commercial importance to its being a free port, and also to its being headquarters in the West Indies for numerous steamship lines. It is also the seat of government of the Danish West Indies. During the last 100 years it has twice suffered severely from hurricanes and in 1867 from a tidal wave. St. Thomas is gradually losing the commercial importance and prosperity it once enjoyed.

Prior to 1880 yellow fever was prevalent, but the cutting of a canal through a neck of land causes a tidal flow in the harbor, and since 1880 there has been no epidemic.

The population of the island is about 12,000 (1891); of Charlotte Amalia, about 10,000. It is lighted by gas.

Provisions of all kinds can be obtained at an advance of 25 per cent. over those of New York.

The authority to visit is the governor. The United States is represented by a consul and vice-consul.

Water can be had in any quantity; costs ½ to one cent per gallon.

Coal.—The usual supply is about 7,500 tons and costs from $6.50 to $7.50 per ton. Large vessels drawing 27 feet can coal alongside the dock. If the coal is brought off in lighters 50 cents per ton is charged; stowing, 10 cents per ton.

Dock.—There is one floating dock; length, 280 feet; length of keel, 288 feet; inside breadth, 72 feet; greatest draft, 21 feet; capacity, 3,000 tons. Crane lifts 40 tons.

Repairs may be made to steamers. Sailing vessels may be repaired here, there being ship-carpenters, sailmakers, and riggers.

Hospitals.—There is one general, one marine, one for the poor, and a lazaretto. The charges are $1 per day. The sanitary condition of the place is good, the streets being clean and well kept.

Port Charges.—Light dues, one cent per ton. Health officer from infected ports only; night service, double fees, $4 to $6. Doctor's visit, $1.50 for each visit or $3 per head if entire crew is contracted for. Laborers, $1 per day without meals, 40 cents with meals. Stone ballast, 75 cents per ton. Spanish bills of health and manifest to Puerto Rico and Cuba in ballast, $17. Bill of health for Haiti, $7; for Venezuela, $6 to $8. Each vessel on arrival will receive a copy of harbor regulations free.

Pilots are not necessary or compulsory. When used the charges are as follows: For sailing vessels inwards: Draft of 10 feet and under, $2, and $1 additional for each additional 2 feet up to 22 feet; 22 to 24 feet, $10; above 24 feet, $15. Outwards: Draft of 12 feet and under, $2; 12 to 14 feet, $3; 14 to 16 feet, $3.50; 16 to 18 feet, $4; 18 to 20 feet, $5; 20 to 22 feet, $6; 22 to 24, $7; above 24 feet, $10. From sunset to sunrise the pilotage is about half as much again in addition. Steamers pay $6 for 12 feet and under; $8 from 12 to 16 feet; $12 from 16 to 20 feet; $18 from 20 to 24 feet; above 24 feet, $24. Between sunset and sunrise they pay $8, $12, $18, $24, and $32, respectively. Warping in harbor, full pilotage; mooring, half pilotage.

Telegraph.—There are three cables, and there is telegraphic communication with all parts of the world.

Steamers.—There are several lines to the United States, to Europe, and ports in the West Indies.

Lights.—A lighthouse, painted white, stands on Muhlenfels Point, and shows 115 feet above the sea a fixed white light, visible 12 miles.

Two small lights are shown in north part of harbor, a red light from Kings Wharf landing place, and a green light from end of new pier to the southward of Kings Wharf.

Frenchman Cap.—In approaching the harbor of St. Thomas f the eastward two small islands to the southward will be observed. ' most southerly of these is a small islet and is perfectly steep-to.

Buck Island, the other, is larger than Frenchman Cap. On south and east sides it is steep-to; on the north side there are 5 f oms of water at the distance of 100 yards, and off the west end a le

of rocks runs to the same distance. Good landing in a little bay at the west end.

Packet Rock, at the distance of $1\frac{1}{10}$ miles northward of the central part of Buck Island and a little more than ½ mile from the shore of St. Thomas, is a small coral shoal, with only 5 feet of water on it. The sea does not always break on it, and it is steep-to, and can only be seen at a short distance.

There is a clear channel between it and St. Thomas.

To avoid it coming from the eastward do not pass to the northward of a line drawn from Ram Head through the south extreme of Dog Island till you are to the westward of Buck Island.

The Triangles are from one to 3 feet above low water and about ⅓ mile from the shore. South of these three rocks, about 200 yards, there is a small detached rock about 35 yards in diameter and having 17 feet of water upon it. A black buoy, surmounted by a black disk, is moored 100 yards south of the rock.

The houses on the summit of the middle hill of the town well open westward of Muhlenfels Point clears both these dangers.

Point Knoll.—Off Muhlenfels Point at a distance of 150 yards is a small coral head with 3 fathoms of water on it, called Point Knoll.

Scorpion Rock.—In the entrance to the harbor and about half-way between Cowell Point and Muhlenfels Point lies the Scorpion Rock, about 27 yards long, 10 yards wide, and having 20 feet of water on it at the lowest spring tides. At 50 yards distance, on each side of the rock, there are from 26 to 30 feet. It is marked by a red buoy surmounted by a black disk.

Rhode Bank, ¼ mile N. 18° W. (N. 17° W. mag.) of Point Knoll, consists of three coral heads lying close together with from 15 to 18 feet water over them. They are marked by a black buoy.

Rupert Rock, being kept whitewashed, is easily distinguished by night or day. At its base are some large bowlders which extend westerly 50 yards, and are just covered with water.

On the westernmost of the rocks is an iron beacon 13 feet high and 3 feet in diameter with diamond-shaped head painted white. Between Rupert Rocks and Havensight Point there are from 12 to 15 feet of water.

The anchorage for vessels in quarantine lies between Rupert Rock and Rhode Bank, having from 5 to 3½ fathoms.

Frederik Knoll.—On the west side of the entrance the shore is steep-to except directly off Frederik Point at the narrowest part of the entrance, where there are two rocky heads with 15 to 18 feet of water on them from 75 to 100 yards from the battery. These are the only dangers on the west side of the channel.

Anchorage.—The best anchorage in the harbor for a ship of large draft, and a good position for weighing, is with the highest part of Rupert Rock in one with the lighthouse, and Long Bay fairly open, in 5½ fathoms. There are several patches of coral in the NE. part of the harbor, the shoalest of which has 16 feet water on it.

Caution.—Care must, however, be taken to observe the port regulation, which forbids a vessel anchoring in front of the fort so as to mask it or prevent it from taking a range of the whole entrance of the harbor. The sterns of vessels anchoring to the eastward must consequently not be more westerly than to bring the flagstaff of the fort to bear N. 24° W. (N. 23° W. mag.), and the bows of vessels anchoring on the western side of the harbor not more easterly than to bring it N. 10° E. (N. 11° E. mag.). Merchant vessels discharging cargo lie off the town to the westward of the fort; those ready for sea, preparatory for sailing, warp into Long Bay, to the eastward of it.

Pilots.—Although the entrance to St. Thomas Harbor presents no difficulties, the assistance of a government pilot, who is also harbormaster, one of whom always comes alongside to offer his services, is frequently useful to point out a convenient berth.

Directions.—Vessels approaching St. Thomas Harbor from the eastward, and intending to take the channel between Buck Island and Packet Rock, should bring the south extreme of Dog Island in one with Ram Head (St. John) bearing N. 83° E. (N. 84° E. mag.), which mark will lead ½ mile to the southward of the Packet Rock and in mid-channel.

Continue steering about west until Rupert Beacon opens westward of Muhenfels Point; then steer for Frederik Battery until the leading marks come on, viz: The tower of the Danish Church in line with the center of the water battery barracks bearing N. 10° W. (N. 9° W. mag.); haul up on this mark, which leads between the Scorpion Rock and Rhode Shoal, and 100 yards westward of the foul ground off Rupert Rock, which last having passed, anchor as convenient. The tower of the Danish Church is low and square, and the water battery barracks consist of a block of one-storied buildings surrounded by a double verandah.

Steamers entering from the westward may go in leeward of the Scorpion Rock, by steering with Frederik Battery and Kiær Tower in one bearing N. 2° E. (N. 3° E. mag.), until Cowell Point touches the south end of Sand Bay (Water Island) bearing S. 89° W. (west mag.), when they will be abreast the Scorpion, and may then shape a mid-channel course, taking care to give Frederik Point a berth of 200 yards.

At Night there is no difficulty in entering the harbor, but it will be better to pass between Buck Island and Frenchman Cap, and having brought the light to bear N. 1° W. (north mag.), to avoid the Triangles and the 17-foot rock south of them, stand in boldly towards the entrance. The Rupert Rock, being whitewashed, will soon show itself.

When leaving the harbor a vessel will generally have a leading wi especially if she weighs before 9 a. m.; for although there is no regul land wind, it frequently happens that the breeze slackens and inclin a little out between sunset and the above hour, and this is observed all the lofty islands. Use the same leading marks, and if the wi should happen to be to the southward of east, she must run to leew of the Scorpion.

Tides.—It is high water, full and change, in St. Thomas Harbor, between 7h. 0m. and 9h. 0m., and the rise seldom exceeds one foot at springs. The mean level of the sea is a foot lower in April and May than at other periods of the year.

Gregerie Channel, immediately westward of St. Thomas Harbor, is formed by Water Island on the south and the shore of St. Thomas on the north. It makes a complete elbow, sweeping round from the west, northerly, to the east. The eastern arm, named East Gregerie Channel, is free from danger, with a depth of from 6 to 7 fathoms. At its entrance, between Cowell and Sprat Points, it is ½ mile wide, and at the elbow or NW. end, between Careen Hill and Banana Point, ¼ mile. The SW. arm, named West Gregerie Channel, is about the same length, and ¼ mile wide, with a depth of from 6 to 9 fathoms. At the head or elbow it opens out into a basin ½ mile in diameter, well sheltered, but obstructed in the center by the Gregerie Bank and Sandy Point Rock. A canal connects East Gregerie Channel with St. Thomas Harbor.

Gregerie Bank is a small patch of dead coral and sand, about 80 yards long and 40 yards wide, and the least water on it is 15 feet, which depth lies with Cowell Point just shut in by Banana Point.

Sandy Point Rock is small, with only 2 feet water on it, and lies near the end of the shallow sand spit which runs off 200 yards to the NW. from Sandy Point. When on the rock, Cowell Battery will be seen just over Banana Point. The distance between it and the Gregerie Bank is less than 200 yards, with a depth of 22 feet. In the channel to the northward of the Gregerie the depth is not less than 27 feet at about 100 yards from the bank.

Anchorage.—Anchorage will be found anywhere in Gregerie Channel clear of the shoals. The safest and most convenient spots are in the elbow and SW. arm, for a vessel will there be more sheltered from the swell which rolls in from the eastward, and will have a steadier breeze and more room for weighing. A good berth will be found either to the NE. or west of the Gregerie Bank; if the latter, Kiær Tower should be just over the northern foot of Careen Hill.

Directions.—Sailing vessels wishing to take up an anchorage in Gregerie Channel had better enter by the eastern arm and leave it by the western. To sail through, run in boldly in mid-channel, and when nearing Gregerie Bank keep Cowell Point open of Banana Point until Kiær Tower begins to open to the northward of Careen Hill; then hard a starboard, and steer down the center of the western arm, in which there are no dangers. This will lead about 100 yards northward of the Gregerie Bank, in 27 feet, but the turning of the elbow is sharp for a long vessel.

Tides.—The flood in Gregerie Channel sets through to the eastward at the rate of about half a knot at springs; the ebb with the same force in the opposite direction.

Great Krum Bay is a small inlet running up between two lofty hills at the western side of the entrance to the SW. arm of Gregerie Channel.

Mosquito Bay is close to the westward of Great Krum Bay, about ½ mile wide between Mosquito and Red Points, ½ mile deep, and open to the southward. Off the latter point a narrow rocky ledge extends along ¼ mile to the southward, and on its extreme end is a small coral head, called Red Point Shoal, with only 2 feet water on it, and steep-to. Within the bay the depth from 5 fathoms gradually decreases toward the shore, but with this dangerous ledge under the lee it is only safe for droghers.

Porpoise Rocks are three small rocks, just out of water, and connected by a shallow ledge. They are steep-to, and lie westward about ⅔ mile from the SW. end of Water Island, with a deep and clear channel between.

Water Island Anchorage.—There is excellent anchorage under the west side of Water Island for vessels of the largest draft. If intending to anchor here, run in about midway between the Porpoise Rocks and the island, and come to in 9 fathoms of water, as soon as the town of St. Thomas is seen coming open to the northward of the island; or with the south extreme of the island S. 35° E. (S. 34° E. mag.), and the north end of Drif Bay Beach N. 78° E. (N. 79° E. mag.).

Southwest Road, between Perseverance Bay and Flat Cays, is a good temporary anchorage with the wind as far to the southward as ESE. The approaches to it are free of danger, except Red Point Shoal. To avoid this shoal keep Flag Hill Peak (on the east side of the harbor of St. Thomas) open to the southward of Mosquito Point, until the south points of Flat and Turtle Dove Cays are in one S. 50° W. (S. 51° W. mag.), when haul up and anchor as most convenient. Mosquito Point and Flag Hill Peak in one N. 81° E. (N. 82° E. mag.), leads 100 yards southward of the Red Point Shoal in 9 fathoms of water.

Tides.—Inshore there is scarcely any stream, but between Flat Cays and Saba Island the flood during the springs runs to the ESE. at the rate of about a knot, and the ebb in the opposite direction with the same velocity.

Great North Side Bay.—On the north side of the island of St. Thomas there are no good anchorages. Directly across the island from St. Thomas Harbor is a deep bight called Great North Side Bay, the eastern side of which is formed by a long tongue of land extending to the NW. from the main island and terminates at Picara Point.

The bay is open to the NW., and therefore liable to rollers. A temporary anchorage may be found under the weather shore.

The only danger in approaching is the Ornen Rock, lying ½ mile N. 63° W. (N. 62° W. mag.) of Picara Point.

St. James Bay is at the eastern end of St. Thomas, and between and Great St. James Island. It is well sheltered, except to the SW and affords a good and secure anchorage except during the hurrican season. To enter it, pass the rocks called the Stragglers, off the sout end of Great St. James Island, at a distance of 100 yards, and anch

with the south extreme of these rocks bearing about S. 29° E. (S. 28° E. mag.), distant 700 yards, and Fish Cay in the eastern part of the bay, bearing N. 72° E. (N. 73° E. mag.).

Cow and Calf Rocks are west of the Stragglers, between which and the nearest point of St. Thomas Island there is a channel having irregular soundings of from 5 to 9 fathoms. In passing through this channel the fort in Little Cruz Bay (St. John)—which being whitewashed and standing alone is easily distinguished—should not be opened to the northward of Great St. James; the fort in one with the NW. point of that island will bear N. 61° E. (N. 62° E. mag.).

The Sound.—There is an excellent anchorage in the space between the islands of St. Thomas and St. John, quite sheltered from all winds except southerly ones, which only blow during the hurricane months.

This space is called the Sound, and is secured against rollers, but the tides are very strong.

The Brothers are two small barren rocks, 20 feet high, lying in the middle of the Sound. A ledge runs off gradually from their north side, deepening to 5 fathoms at the distance of 250 yards; they may be approached on their south side to the distance of 100 yards.

To enter the Sound from the southward the channel lies between St. John and Dog Islands, at the east end of St. Thomas.

South Channel to the Sound.—The Brothers may be passed on either side, but care must be taken not to pass to the eastward of a line drawn from the west end of Grass Cay to the south end of Meeren Cay. in order to keep clear of the reef off Turner Bay.

Northern Channels into the Sound.—There are three channels by which a vessel may enter the Sound from the north, called the Windward, Middle, and Leeward Channels. The approaches to the northern channels between the islands to the northward of Tortola, St. John, and St. Thomas present no serious difficulty. The eastern passage between Tortola and Jost Van Dyke is especially clear and safe. It is only necessary to keep in mid-channel, where the least water is 9 fathoms.

Jost Van Dyke Island is lofty and rugged, bold and steep-to, and rises to the height of 1,060 feet. On the south side are two small bays called Great and Little Harbors; they are only fit anchorages for coasters.

Little Jost Van Dyke Island is separated from the east end of the greater island by a shallow ledge 200 yards wide. Close to its east end is a small islet named Green Cay. South of the cay there is a small dry rock, and shallow water for nearly ¼ mile.

Sandy Cay.—Its east end is 66 feet high, but to the westward it terminates in a low sand spit, and both ends are foul to the distance of 200 yards. The channel between it and Jost Van Dyke is ½ mile wide, but the Jost Van Dyke shore, which is steep-to, must be kept aboard.

Great Tobago.—A small rock awash and steep-to lies about 100 ards from the north point. The south side of the island is fringed

with coral to a short distance, but all elsewhere the shore is bold, close home to the cliffs.

Watson Rock, ¼ mile from the SW. side of the island, is a remarkable small, barren, perpendicular rock, steep-to, and terminates in a peak 90 feet high.

Mercurias Rock.—The channel between Jost Van Dyke and Great Tobago is clear of dangers with the exception of Mercurias Rock having 7 feet of water on it.

The rock is small and steep-to, and can be easily avoided by keeping the Jost Van Dyke Shore aboard.

Little Tobago is nearly ½ mile in length, ¼ mile in breadth, and 280 feet high. There is a safe and clear channel between these islands, but as nothing would be gained it will be better to pass through either of the others; should it be necessary, however, to take it, keep a little to the windward or eastward of Little Tobago, taking the bearing of Watson Rock to avoid the King Rock which is awash, small, bold, and steep-to. Between it and Great Tobago the depth is 6 and 7 fathoms.

Hans Lollik is a high rocky islet, lying 3½ miles SW. of Little Tobago.

Little Hans Lollik is a smaller and lower islet 400 yards to the northward. The two are connected by a coral ledge nearly dry. Still farther to the north, at a distance of 200 yards, is a third and smaller islet with a sunken rock close off its north side.

The western sides of these islets are steep-to, but to the southward is the Hans Lollik Rock, 700 yards from the south point of Hans Lollik. This rock is about 200 yards in diameter, is awash, and can be seen from a ship's deck about one mile.

To the southward of the chain of islets just described are the northern entrances into the Sound.

Directions.—The channel between Hans Lollik and Little Tobago is free of danger, but being to leeward of the middle or inner channels to the Sound a vessel may have to beat through, and this can only be accomplished with the flood tide. It is therefore more useful to vessels running through Sir Francis Drake Channel, and northward of St. John, with the wind well to the northward; or to those leaving the Sound. Should the wind be so far to the northward that they can not fetch through, they may take the channel between St. Thomas and Hans Lollik, which is a mile wide.

Windward or Inner North Passage lies between the Lovang and Durloe Cays, and is about 600 yards wide.

Durloe Cays are three small islets near the NW. point of St. Joh and are easily distinguished. The most southerly and largest of the cays is 60 feet high. They are clear and steep-to.

Blunder Rocks, off the east end of Lovango Cay, are awash, an extend about 400 yards from the cay.

Congo Cay is a short distance north of Lovango Cay, and has two remarkable rocks off its eastern point, of which the easternmost, about 400 yards distant, is called the Carval Rock, and marks the western side of the entrance to the windward channel.

Tides.—In this channel the ebb runs NE. by N., the flood SW., at the rate of 2 miles an hour. The channel may be used by the largest vessels as long as a speed of 4 knots can be depended upon, the current at times reaching 2½ miles an hour. Should the wind die out, a vessel may anchor, observing that under 10 fathoms the bottom is rocky and not good holding ground.

The dangers in this channel are all apparent, but, with the ebb tide running against the wind, there is a tide rip which looks like broken water, and is apt to alarm a stranger.

Between the Durloe Cays and between them and the island of St. John there are deep and clear passages, but it is better to pass to the westward of the Durloe Cays. Between Lovango and Mingo Cays there is a 3-fathom passage, but, as it is narrow and the tide strong, it is only fit for boats.

Middle Passage, between Grass and Thatch Cays, is about 600 yards wide, but being to leeward, is mostly used by vessels leaving the Sound. It may, however, be taken from the northward on the ebb, provided a vessel can lay up SE.; and she may work through from this, being careful to avoid a small rock awash, lying N. 74° W. (N. 73° W. mag.) rather more than 150 yards from the west end of Grass Cay. This danger can easily be seen from aloft, and as it lies on a line with the northern parts of Congo and Grass Cays in one, bearing N. 69° E. (N. 70° E. mag.), in coming from the northward this will be a warning of approach; and going through from the southward, when Congo is seen northward of Grass Cay, the vessel may be hauled to the wind.

Tides.—In the middle passage the flood sets to the southward at the rate of about 2 knots at springs, and takes a SE. direction inside; the ebb runs in the opposite direction with the same strength.

Leeward Passage, between Thatch Cay and the north side of St. Thomas, is 800 yards wide, and has no danger in it whatever. The flood sets through to the eastward at the rate of about 2 knots, and the ebb with the same velocity in the opposite direction. Being so far to leeward, it is only used by vessels running through from the eastward. The west point of Thatch Cay may be rounded close, when they can haul up, passing either eastward or westward of Hans Lollik.

Shark Islet.—Shark Islet is small, rocky, 40 feet high, and lies near the shore at the east end of St. Thomas. If the channel between Hans Lollik and the Ornen Rock is taken, keep the west point of Thatch Cay in one with Shark Islet, S. 57° E. (S. 56° E. mag.), until clear of Hans Lollik Rock.

Current Hole and Passage is between Current Hole Point, at the east end of St. Thomas, and great St. James Island, nearly 400 yards

distant. The passage is divided nearly in the center by the Current Rock, 15 feet high, and between it and St. Thomas there are only 9 feet water; but on the St. James side a vessel will carry 23 feet through a small vein not quite 100 yards in breadth and 200 yards in length. The tides rush through the opening with such violence as to cause a strong race, which gives the name of Current Hole to the small bight between it and Cabrita Point, the eastern extreme of St. Thomas.

The course through the channel is S. 22° W. (S. 23° W. mag.). It is quite safe and may be useful to vessels running to the southward through the Sound when unable to weather Dog Island and Rocks. As soon as Current Rock is passed, steer out S. 27° W. (S. 28° W. mag.), passing between Cow Rock and the Stragglers, off the SW. point of Great St. James, all of which are steep-to and well above water.

Tides.—The flood sets through Current Passage to the southward at the rate of at least 3 knots, and the ebb with equal force to the northward; and, as it should be taken by a sailing vessel on the ebb, there must be a steady, commanding breeze to stem it.

St. James Cut.—A depth of 20 feet may be carried through the cut between Great and Little St. James, passing on either side of the Welk Rock, which lies on the eastern side of the islands. The channel is on the Great St. James side, but so circuitous as to be by no means safe. The eye will be the best guide for it.

Dog Island Cut.—The opening between Dog Island and Little St. James is barred across with only 3 fathoms of water and having also a 9-foot rock in mid-channel.

Neither of the last three channels should be attempted by a sailing vessel except in a case of emergency and with a commanding breeze.

Brass Islands are two small islets close off the north side of St. Thomas, and about 3 miles westward of Hans Lollik; the Inner Brass is 260 feet and the Outer Brass 430 feet high. Between the inner islet and St. Thomas there is a 5-fathom channel 400 yards wide; and between the two islets there is a channel of 7 fathoms, 600 yards wide, but they are only safe for coasters.

Tides.—The flood sets between them to the SW. at the rate of about a knot, but the ebb is scarcely perceptible.

Anchorage.—Under the Inner Brass there is secure and well sheltered anchorage for coasters in 6 or 7 fathoms water at about ½ mile off shore, with the north end of the islet N. 10° E. (N. 11° E. mag.).

Lizard Rock is a small, rugged islet, 15 feet high, bold and steep-to on all sides; it lies about ¾ mile westward of the Inner Brass Island.

West and Salt Cays are only separated from the west end of S Thomas by a small boat channel. They are each about ½ mile long a lie close together; Salt Cay, the outer one, is 250 feet high, bold, a and steep-to.

Dutchman Cap, to the northward of Salt Cay, is a remarkab small, rocky islet, rising abruptly from the sea to a peak 270 feet hig

with deep water close around. At about 100 feet from its SW. side there is a small rock 3 feet out of water. Between it and Salt Cay the soundings are from 14 to 18 fathoms.

Cockroach Island is a small rocky islet of irregular shape, with a flattish summit and bold perpendicular cliffs 155 feet high. It is nearly of the same size as Dutchman Cap. The passage between is quite free of danger.

Cricket Rock is the most northern islet of the group in this direction. It is 45 feet high, bold, and steep-to, and there is a clear channel between the two islets.

Savana Island is uninhabited, but used for breeding goats. On its west side it is steep-to, having 16 fathoms 100 yards from the rocks. Some detached dry rocks extend nearly 100 yards from its south point, with 15 fathoms close to their outer edge; there are also some straggling rocks 8 or 10 feet high, bold, and steep-to, extending about ¼ mile off its eastern side. Close to its north point is a small sunken rock.

Turkey Cay, in the middle of the Savana Island Passage, is a small narrow islet, 80 feet high, and surrounded by deep water except at the south end, where there are 3 fathoms at a short distance.

Salt Water Money Rock is about ½ mile to the SE. of the cay, is 10 feet high, bold, and steep-to, with a clear channel between.

About half way between the north end of Savana Island and the west end of Salt Cay there is a small coral patch with only 5 fathoms of water on it.

Everywhere else in the passage the depths are from 13 to 16 fathoms.

Directions.—The above channel may be safely navigated by sailing vessels, the only caution necessary being to guard against the tides, which in the Savana Passage run at the rate of 3 knots and in the others about one knot. With the ordinary east wind a vessel will scarcely be able to stem the ebb which sets to the NW. in the passage, and it will be better in beating up to haul close round the south end of Savana Island and stand well to the southward, so as to avoid the strength of the inshore tide. With the flood it will be an advantage to take this passage, as by keeping along shore the whole of its strength will be gained and smooth water.

Sail Rock—so called from its great resemblance to a vessel under sail—rises precipitously from the sea to the height of 125 feet. It lies S. 16° W. (S. 17° W. mag.) 3¼ miles from Savana Island and is a remarkable object from off the harbor of St. Thomas. It is about 100 yards in diameter, quite barren, with a light grayish appearance, from its being frequented by birds at certain seasons. Nearly 200 yards S. 67° W. (S. 68° W. mag.) of it there is a small rock nearly awash, the only danger near it; on all other sides it is bold and steep-to.

Passage Islands.—The islands and cays lying between the Virgin Passage and the east end of Puerto Rico are sometimes called the Passage Islands. They belong to Spain and are dependencies of Puerto Rico.

Culebra Island, sometimes called Carlit and Serpent Island, is of a very irregular outline. It is uninhabited, of moderate elevation, broken and rugged, thickly wooded, with scarcely a level spot on the surface, and near the center rises to the height of 650 feet. The northern shore is bold and steep-to.

On all other sides there are small islets and reefs which shelter good anchorages, and at the east end there are two excellent harbors, but no water.

Northeast Cay is oval-shaped, 340 feet high, and thickly wooded.

Bird Cay is 300 yards N. 1° W. (north mag.) of the east end. It is a remarkable small rocky islet, 60 feet high, and at about a mile to the NE. of this end are the Shark and Whale Rocks, two small rocky islets 16 and 10 feet high; S. 46° E. (S. 45° E. mag.), 800 yards from these, are the Palada Cays, two small rocky islets, 80 and 84 feet high and steep-to.

Culebrita Islet lies to the SE. of Northeast Cay and at about the same distance as the latter from the shore. It is of irregular shape, 305 feet high, and thickly wooded. From the south end a reef, nearly dry, extends in a SSW. direction for 2½ miles and protects the Sound and Mangrove Harbor. Six hundred yards from Pond Point (the NW. end of the islet) is Davy Cay, a small rocky islet 30 feet high.

Light.—From a lighthouse on the highest part of Culebrita Islet a fixed white light is exhibited, at an elevation of 305 feet, and is visible in clear weather about 12 miles. (Reported visible 18 miles.)

Anchorage.—Excellent anchorage will be found within the cays and islands just described, but the best, called the Sound, is toward their southern end under the lee of the reef, in front of the Great Harbor, a clear space 1½ miles in length and ½ mile in breadth.

The best anchorage in the Sound is with the extreme west end of Davy Cay, touching the east end of Bird Cay, N. 18° W. (N. 17° W mag.), and the SE. end of Culebrita, S. 68° E. (S. 67° E. mag.), in 10 or 12 fathoms water, sand. Here a vessel will be in a good position for weighing, and will be protected by the reef to the southward, which, although broken and scattered, is sufficiently compact to break the sea.

Middle Ground.—In the approach to the Sound the space between Culebrita and the main island is somewhat obstructed by a shoal on which the depth varies from 2 to 5 fathoms; the shallowest part lies about 500 yards from the nearest part of Culebrita.

Weather Channel.—To enter the Sound from the northward betwe Northeast and Davy Cays, there are three passages. The southern these between Palada Cays and Culebrita is the most direct, but too difficult for a stranger, as no mark can be given. The second middle passage is between Palada Cays on the south side and the Sha and Whale Rocks on the north. The western and safest passage between the latter rocks and Northeast Cay. From the latter ca

reef extends to the SE. for ¼ mile, and from Davy Cay a shallow ledge runs off nearly 400 yards, forming the Weather Channel, about 300 yards in breadth, and the least depth 23 feet.

Directions.—To take the western passage, steer boldly down toward Northeast Cay, and having passed the Whale and Shark Rocks at the distance of rather more than 200 yards, bring the western extreme of Davy Cay to touch the extreme of the remarkable bluff at the east end of Culebra. Keep them in one, until the southern sandy beach of Northeast Cay comes on with the north end of Scrub Cay—a small rocky islet, near the north side of Culebra; then keep away S. 55° W. (S. 56° W. mag.), steering for the Dolphin Head—a remarkable hill at the east end of Culebra. When Sandy Point of Culebrita opens out clear of Pond Point, haul up gradually for the bluff, and anchor as most convenient. If going above the Middle Ground, keep the Culebra shore aboard.

Tides.—It is necessary to observe that the flood sets in from the north, between Northeast Cay and the Palada Cays, at the rate of 1½ knots, and the ebb runs out with equal force in the opposite direction.

Lee Channel, between Northeast Cay and Culebra, is ½ mile wide, and has no danger in it until the Middle Ground is approached. The wind, however, is generally so unsteady under Northeast Cay, that without it is so far to the northward as to enable a vessel to lay up ESE., it should not be entered in a sailing vessel except on the flood. The ground is quite clear, and the shore bold, until abreast of Duck Point; thence to the bluff it is fringed with a reef, to the distance of 100 yards, distinctly seen from the deck. About ¼ mile to the northeastward of Duck Point there is a small coral patch with a depth of 28 feet on it.

Directions.—Entering by the Lee Channel keep midway between Northeast Cay and Culebra, until nearly abreast of Duck Point, when the island side should be kept aboard, to avoid the Middle Ground. The bottom is distinctly seen when in a less depth than 10 fathoms, and the shoal ground may be avoided by the eye.

South Channel.—A vessel may leave the Sound either by the Lee or the South Channel. The former, however, is the best.

The Tides in the South Channel run 2 knots an hour; the flood SW. by S., and the ebb NE. by N.

Directions.—Proceeding through the South Channel, after passing the bluff, border well toward Water Cay, which is 20 feet high, and pass it at 200 yards to avoid the Porgee Heads, which are awash inside the outer reef, and become visible, if the atmosphere is clear, from abreast Mangrove Harbor. When nearly abreast of Breeze Point, at the entrance of Mosquito Bay, the east extreme of Water Cay must be brought to touch the hummock on Culebrita N. 38° E. (N. 39° E. mag.), which mark will lead between the Yellow Shoal and Reef Heads, easily seen if the sun does not shine directly over them. The Hummock is a small rocky hill, 93 feet high, on the NE. point of Culebrita, somewhat

like a gun quoin, with the thick end to the southward, and is readily distinguished. In this channel the depth will be from 8 to 13 fathoms, and perhaps a cast of 5½ fathoms on a small knoll SE. of Breeze Point. When the peak of Southwest Cay comes open off Soldiers Point (the south end of Culebra), N. 57° W. (N. 56° W. mag.), a vessel will be clear of the shoals, and may haul to the wind.

There is seldom a leading wind into the Sound through this channel, but for a steamer it is safe and easy.

Mangrove Harbor is small but well sheltered. Its entrance lies between Bluff Point on the north and Water and Battle Cays on the south. The entrance is about 300 yards wide with a depth of 7 to 8 fathoms, decreasing inside to 5 fathoms, with a bottom of sand and mud. The head of the bay is shallow. In entering the harbor, having rounded Bluff Point, steer in midway between the reefs, which are bold and can be seen distinctly, and anchor as convenient. It may not be easy to get out under sail, as the channel trends NW. and SE.

The Basin.—On the south side of Mangrove Harbor there is a bight about 600 yards long and 200 yards wide, and having a depth of 4 fathoms of water. It is separated from the harbor by a bar with 14 feet of water on it, and is a secure place for a small vessel to anchor.

Mosquito Bay lies close to the entrance of Great Harbor, between Harbor and Breeze Points. It is a good temporary anchorage, but, being partially open to the southward, a heavy swell frequently sets in from that quarter.

Great Harbor is one of the most secure basins in the Windward Islands, about a mile in length, and in some parts ½ mile in breadth, but of irregular shape, and with several small creeks on its shores. The entrance is between two bold reefs, leaving a channel nearly 200 yards wide, through the center of which a vessel will carry 5 fathoms water, and within it 5 to 7 fathoms. The great drawback, however, to this otherwise advantageous harbor is the presence of four coral shoals in the fairway to the entrance, almost blocking it up, and for which no good leading marks can be given. To a steamer they are not so formidable, as she has only to steer along the reef between Soldiers Point and the entrance of the harbor on about a N. 22° E. (N. 23° E. mag.) course; giving the reef a berth of 300 yards, so as to avoid Yellow and Grouper Shoals, and having passed them, to steer boldly on through the center of the channel.

Yellow Shoal, with only one fathom water on it, is the southernmost, and its south end lies about N. 81° E. (N. 82° E. mag.) ¾ mile from S diers Point. The Shrimp has two fathoms on it, and lies about S. 1 W. (S. 11° W. mag.), nearly ¼ mile from Breeze Point; the Group with 1⅛ fathoms on it, ½ mile S. 67° W. (S. 68° W. mag.) of the Shrim and the Snapper, with one fathom on it, midway between Breeze Po and the entrance.

Directions.—The best route for a sailing vessel bound into Gre Harbor is to run through the Sound and South Channel, and pa

between the Grouper and Shrimp Shoals, with the wind abeam, which must be done with the eye alone, from aloft. In fact the pilotage, from the absence of any marks, is far too intricate for a stranger without the assistance of a pilot or good local knowledge. It would also be difficult for a sailing vessel to get out of the channel without warping, and with the wind well to the northward.

The Grampus Shoals are a group of small isolated coral heads, with from 3 to 4 fathoms of water on them, rising from a bank with 10 fathoms of water on it, and extending to a distance of 4 miles to SE. of Culebra.

There is a passage between these shoals and the reef which extends to the south from Culebrita, but no safe directions can be given for it. Large vessels had better pass to the southward of these shoals.

Southwest Cay.—From its center a wooded peak rises 500 feet. All along the eastern side, at 200 yards distance, there is a coral reef, and the Culebra Shore is also foul for about this distance.

The channel between the north point of Southwest Cay and Stream Point, on the Culebra Shore, is 700 yards wide, with a shoal in the center on which the least water is 26 feet, with 6 and 7 fathoms of water all around it. The tides sweep through this channel with a velocity of 3 knots; the flood to the south and the ebb to the northward.

There is good anchorage, with the prevailing winds, between Southwest Cay and Culebra. A good berth will be found in 13 fathoms of water with Scorpion Point, which runs out low and terminates in a small pinnacle, bearing S. 80° E. (S. 79° E. mag.), distance 700 yards.

In fact there is good anchorage anywhere on the lee side of Culebra.

Seine Bay, just to the eastward of Scorpion Point, has a good beach and excellent fishing with the seine.

Snug Bay, the next cove to the eastward, is a good boat harbor.

Northwest Channels.—The channels between the NW. point of Culebra and the cays and rocks to the westward are clear and easy to navigate, as all the dangers are apparent to the eye.

Pilot Rock Channel is between the NW. point of the island and Pilot Rock. All that is to be done in taking this channel is to avoid the reef, seen running off 300 yards from the point, and steep-to.

Pilot Rock is barren, 30 feet high, bold, and steep-to.

Twin Pass is formed by the Pilot Rock and the Twins; the latter are two small barren rocky islets, about 20 feet high, lying close to each other about ¾ mile westward of the Pilot. At ¼ mile SE. from the Twins is a rock awash, named High Breaker, and steep-to. The best channel is between it and the Pilot, as there is generally a leading wind through either way.

Fungy Bowt is a remarkable barren round whitish rock, 145 feet high, with rugged perpendicular sides. Fungy Bowt Channel between the rock and the Twins is clear and safe, but be careful of a small head 200 yards westward of the Twins, and on which the depth is only one fathom.

Washer Passage is between Fungy Bowt and the Washer, a small rock only 2 feet out of water, lying N. 35° W. (N. 34° W. mag.) ⅔ mile from Fungy Bowt. This channel is bold and clear, with a depth of 14 and 15 fathoms in it. A vessel may also pass to the westward of the Washer, which is bold and steep-to.

After passing to the southward of Fungy Bowt another chain of small islets will be observed lying to the WNW. of Southwest Cay.

Sisters. The three islets nearest Southwest Cay are the Sisters, all nearly of the same size, about 35 feet in height, and not more than ¼ mile apart. The two western appear in one when bearing S. 12° E. (S. 11° E. mag.), consequently when on that line the three islets appear as only two. The eastern one is 700 yards from the NW. point of Southwest Cay, with a clear channel between.

Cross Cay, 1¼ miles westward of the Sisters, is narrow, its central part projects to the NE. nearly ¼ mile, thus forming three legs; it is 130 feet high, and covered with long grass and bushes. At about midway in the channel between it and the Sisters is the Black Rock, a small islet 15 feet high.

Cactus Cay is 95 feet high. At its south end there is a remarkable pillar-shaped rock, 75 feet high.

The channels between the cays, just spoken of, are all clear and free of hidden dangers; all the rocks are steep-to. For sailing vessels, however, the best passages are to the westward of the Sister Cays, for under the high land of Southwest Cay the wind is apt to be variable.

Tides.—In all of these channels the flood tide runs to the southward at the rate of about one mile an hour, and the ebb in the contrary direction at the same rate. The rise and fall seldom exceed a foot, and, as is the case near the islands of St. Thomas and St. John, the mean level of the sea is about a foot lower in April and May than during the remainder of the year.

The flood coming in from the northward sweeps round the bluff and over the reef to the SW. of Culebrita at the rate of about 2 knots at the springs; it there slackens its pace, and meeting the stream setting down on the western side of Culebra, it then trends to the southward toward the east end of Crab Island.

The ebb sets over the Culebrita Reef, taking the lee and weather channels out of the sound in a reverse direction, and much at the same rate.

On the west side of Culebra the stream of flood, having reached Southwest Cay, runs to the SSE. toward the east end of Crab Islan

The channels lying between Cactus Cay and the Washer on the e and the coast of Puerto Rico on the west have not been accurately s veyed.

Crab (Vieques) Island.—A ridge of small hills runs nearly its wh length along the middle of the island, and rises to a moderate heig named Mount Pirata, at Vaca Point, the SW. extremity of the isla

Between it and Culebra the soundings are regular and the depth from 12 to 16 fathoms. The east end of the island is low, bold, and steep-to, and on the south side the edge of soundings runs along at the distance of about 1½ miles.

The south coast of the island is indented by several small bays and is free from danger.

Danes Bay, the first of any consequence, is about 2 miles from the east end. Nearly abreast the bay, about ¼ mile from the points, are two small islets, which may be passed on either side.

To the westward of Danes Bay there are several anchorages for small vessels: Grant Port, Man-of-War Cay, Tapoon Creek, Port Ferro Harbor, and Mosquito Bay. At the entrance of Port Ferro there are 10 feet of water, increasing to 17 feet inside.

Sound or Settlement Bay is to the westward of these small harbors and is defended by a small fort. In front of it are two small islets called Soldier and Water Cays; the latter, which is the outermost, lies nearly a mile westward of the SE. point of the bay, and about ½ mile from the shore. On the west side, within ¼ mile of it, there is anchorage in 4 or 5 fathoms water.

Toward the SW. point the bottom is rocky and the soundings irregular.

Arenas Bank.—From Vaca Point the west side of Crab Island trends about NW. by N. 3 miles to Arenas Point. The edge of soundings is here about 4 miles distant, and the shore bold and steep-to, as far as the south end of the sandy beach which forms the NW. extremity of the island. Here a spit of sand runs off N. 35° W. (N. 34° W.) for 3 miles from Arenas Point, upon which are several spots of only 6 feet water; those at its extremity are covered with dark weed, but not being sufficiently discolored are very dangerous.

To avoid the north end of this spit do not open Cape Mala Pascua of Naranjo Point, at Puerto Rico, and when El Yunque or Anvil Peak is shut in with the hill on the western headland of Bahia Honda N. 57° W. (N. 56° W. mag.), a vessel will be to the eastward of it.

Anchorage.—There is good anchorage under the west side of the island in 5 fathoms water, with Arenas Point N. 67° E. (N. 68° E. mag.) and the SW. point of the island about SE. Towards the SW. point the bottom is rocky and the soundings irregular.

Water.—A small rivulet empties at the south end of the beach which forms the NW. extremity of Crab Island, but near the shore it is brackish; a small supply of good water, however, may be obtained a short distance above the outlet. Water may be obtained at Port Mula from a large cistern built in the square of the town of Isabella.

Port Mula.—From Arenas Point the northern shore of the island trends E. by N. ½ N. 8 miles, when it bends abruptly to the northward for about ½ mile, forming a small bay called Port Mula. At the mouth

of a little stream on the south side of the bay is the principal village of the island, named Isabella II. It contains about 1,000 inhabitants, and is the residence of the governor, who is nominated by the captain-general of Puerto Rico. At about a mile inland from the village is a hill called Soldier Mount.

Anchorage.—A reef of broken coral with from 9 to 16 feet water on it extends nearly across the mouth of the bay. Inside this bar or reef there are depths of from 2½ to 3½ fathoms, but with many shoal patches.

Anchor outside the bar in not less than 6 fathoms as inside of the 6-fathom line the sea breaks during strong northerly winds and the holding ground is very bad.

Light.—A fixed white light is exhibited from a post 10 feet high on Point Mula and is visible 5 miles.

Mula Shoals.—There are three dangerous shoals lying northwesterly from Port Mula, about 1½ miles from the shore, called the Caballo Blanco, Corona, and the Mosquito Shoals. All three of these shoals are awash, or nearly so.

The Caballo Blanco bears N. 52° W. (N. 51° W. mag.) 1½ miles from the north point of Point Mula; the Corona is S. 70° W. (S. 71° W. mag.) 1½ miles from the Caballo Blanco, and the Mosquito ½ mile S. 67° W. (S. 68° W. mag.) of the Corona.

At about ½ mile westward of this latter shoal there is a small patch of 16 feet water; and a similar one of the same depth, S. 6° E. (S. 5° E. mag.) of the Caballo Blanco, nearly midway between it and the shore, and N. 74° W. (N. 73° W. mag.) one mile from Mula Point.

Directions.—In approaching Port Mula from the eastward, after getting abreast of Point Caballo Colorado, the northern extreme of the island, the coast should be skirted at the distance of ½ mile till arriving at Point Mula, which should be rounded at a distance of 600 yards, when a convenient anchorage may be picked out, with the village bearing S. 46° E. (S. 45° E. mag.). This course will lead between the Caballo Blanco and the coast of the island.

Caution.—A vessel beating up outside these shoals should not bring Arenas Point to the westward of S. 55° W. (S. 56° W. mag.); or Cape Mala Pascua to the westward of S. 64° W. (S. 65° W. mag.) until Caballo Colorado bears southward of S. 74° E. (S. 73° E. mag.) which latter bearing leads northward of the Caballo Blanco.

Cabello Colorado Point is rocky and steep-to, and is nearly 3 miles from Mula Point. Thence to Diavolo Point the shore trends about E. ¾ S. 4 miles; about midway, close to the land, is Red Rock (or la Campana); to the westward of this rock the shore is foul, b to the eastward it is bold and clear.

North, nearly ½ mile from Diavolo Point, there is a small rocky patc nearly awash, called the Cockroach Shoal.

Pelican Harbor.—Eastward of Diavolo Point the shore is irregula a mile from it, and about ¼ mile from the shore is Pelican Cay, fr

whence a broken reef runs parallel with the shore for 1½ miles; through it are several small cuts of 12 feet water, leading into snug anchorage for coasters.

Saint Croix Island.—This island is 19 miles long, but of irregular breadth. The south side is nearly straight, and generally low, particularly towards the west end. Near the center of the north shore, at the head of a deep bight, is the town of Christiansted, the capital of the island, and seat of government of the Danish colonies. From the town to the south shore of the island, the distance is about 2½ miles across, and from thence the breadth gradually decreases to the eastward, and terminates in a bluff point, with a sugarloaf elevation of moderate height just within it.

The western portion from the bight, preserves a general breadth of 5 miles, and becomes more elevated on the north side. Mount Eagle, the loftiest summit in the island, 3½ miles east of Hams Bluff, at the NW. extreme of the island, is 1,164 feet high. Numerous small rivulets empty themselves into the sea, chiefly on the southern shore, but most of them disappear in the dry season, and it is consequently badly watered at that period, and what is obtained is unwholesome until allowed some time to purify. The island is scantily wooded, but highly cultivated, and its roads are excellent. Its population is about 18,500.

Caution.—Vessels passing the SW. end of the island should keep well off at night, as the north side hills may deceive as to the distance from the island.

North Coast.—From Hams Bluff, formed of remarkable steep cliffs, to Barons Bluff the shore is steep-to and the bank of soundings does not extend more than ½ mile off shore.

Between Barons Bluff and Salt River Point, but nearer the latter, is a narrow cut in a reef leading to a deep inlet called Salt River, in which, however, there is only shelter for boats. Salt River Point is rather low, and forms the north extreme of St. Croix and the NW. point of the bight of Christiansted.

Four hundred yards north of the point lies the White Horse, a dangerous rock which generally breaks, and between it and the shore there is a boat channel carrying a depth of 2 fathoms.

Christiansted Harbor is well protected on the north by reefs almost dry. The harbor is small and only fit for a few vessels drawing not more than 17 feet.

The population is about 8,000. The streets are clean and the sanitary condition is excellent.

Provisions of all kinds can be obtained at a cost of from one-quarter to one-half more than in the United States.

The United States is represented by a consular agent.

The governor, by law, now resides six months of the year at St. Thomas and six months at this place.

Water can be had at a cost of half a cent per gallon. It is rain water collected in tanks and brought to the pier by pipes, from which boats can take it on board.

Coal can be had in small quantities; cost, about $9 per ton.

Telegraph.—There is telegraphic communication with the United States, St. Thomas, and surrounding islands, also a telegraph and telephone to Frederichsted.

There are no steamers, but the mail leaves for St. Thomas twice a week.

Hospitals.—There is one which is well conducted by two Danish doctors and has accommodation for 230 patients; cost, from $2.50 to $3 per day; one for the insane, one for ulcerated patients. Private patients have separate apartments.

Port Charges.—Anchorage dues, 22½ cents per ton; mooring, $4; health officer, $3 for schooners, $5 for barks and brigs; pilotage, $1 per foot draft. There are no light dues.

The duties on exports are 5 per cent on sugar, 3 per cent on rum and molasses.

Pilots are prompt to answer a signal made for them from any vessel needing their services. Their station is on Protestant Cay, close off the town.

Light.—The entrance to the harbor is protected by Fort Louisa Augusta, from the flagstaff of which there is exhibited a fixed white light, visible 8 miles; there is also a white light shown in front of the customhouse and one on building to the left.

Scotch Bank.—From Fort Louisa Augusta, a tongue of sand called the Scotch Bank, having in places only 4 feet water on it, stretches to the northeastward for 1¾ miles. Between the western edge of this bank, which runs in a N. by W. direction from the fort and extends off rather more than ½ mile, and the east end of the Long Reef fronting the town, is the entrance to the harbor. At about 1½ miles eastward of the fort is a small islet with two hillocks on it, named Green Cay. The NE. point of the cay, bearing S. 6° E. (S. 5° E. mag.) and in line with Sight Mill, leads in eastward of the Scotch Bank; and Barons Bluff open of Salt River Point S. 86° W. (S. 87° W. mag.) leads north of it.

Directions.—Vessels bound to Christiansted generally approach it from the north or NE. In this case, having passed Buck Island—observing precautions to avoid the reef—haul in towards Green Cay. In standing towards the Scotch Bank take care to keep Barons Bl open of Salt River Point. Having neared it, Fort Louisa Augusta be seen at the NE. end of the town, when it should be brought in l with the first hill to the eastward of a large notch or saddle formed two hills. Steer in on this line, S. 18° E. (S. 17° E. mag.), very ca fully, and it will lead to the entrance of the channel, and outer buo which lie about 400 yards within it.

Vessels drawing only 10 feet may lie alongside the jetty of the to

Eastern Channel.—There is a channel over the inner part of the Scotch Bank with a depth of 12 feet in the center, which may be used by vessels of light draft. The chart will be the best guide.

Richmond House is a large building with a red roof, standing in grounds of a park-like appearance on the sloping land near the sea.

For a sailing vessel, although easy of access at almost all periods, it is difficult to get out of the inner harbor, and in the months of January and February, when the wind hangs to the northward of east, a vessel may meet with considerable detention. With the usual trade wind she must warp up to the entrance; buoys are conveniently placed for that purpose. Toward daylight it is generally calm, when a vessel may be able to tow out, assisted sometimes by a light land air from the SE., which will enable her to obtain an offing clear of the shoals before meeting the regular breeze.

Caution.—The town of Christiansted is easily made out, but Fort Louisa Augusta, the front mark of the range leading to the entrance buoys, has, at a distance, no appearance of a fort and is not easily distinguished.

Protestant Cay can easily be mistaken for the fort, especially as a flag is kept flying from a staff on the cay and none on the fort. The range should be used with caution and only for the purpose of finding the entrance buoys.

When expecting vessels of more than usual size the pilots place a small wooden buoy on the inner (SW.) point of the Scotch Bank.

Changes of Channel.—After a heavy northerly swell has continued for several days, the western extremity of the Scotch Bank will change its location. This is particularly noticeable at the SW. point. The Welcome Bank is gradually extending into the harbor, but has not advanced, as yet, enough to cause any change of importance.

There is no great difficulty or danger in entering the harbor provided the wind is not strong nor the sea heavy. Vessels drawing over 12 feet and over 200 feet long, especially if they do not turn quickly, should take a pilot, for the first visit at least. The harbor being small, the buoys numerous, of the same color and in close proximity to each other, make the first entrance confusing to a stranger. All vessels should be prepared to anchor with a stream anchor by the stern, and should have ready warping lines on each bow, with boats to run them to the buoys. There are two turns in the channel over 90°, and the radius of the curve is not greater than 600 feet, while the radical changes of course occur within 400 yards' length of each other. Going out less difficulty will be experienced, as the prevailing wind, the NE. trade, assists the turning. The harbor is said to be filling up slowly.

Buck Island, 340 feet high, is one mile in length and rises on the southern edge of a dangerous coral bank, which extends westward about ¾ mile and sweeps round one mile north of the island. There are also several shallow patches as far eastward as 1¼ miles.

The island lies directly in the route to the harbor, and should therefore be carefully approached. For this purpose Hams Bluff must be kept well open of Barons Bluff; these bluffs in one will lead 400 yards outside the reef, in 4 fathoms water. The channel between the west end of the reef and the NE. end of Scotch Bank is 1½ miles wide. To the westward it leads to the eastern channel into Christiansted Harbor, and to the eastward toward Buck Island Anchorage.

Anchorage.—There is good anchorage, in 4 fathoms, to the SW. of Buck Island, and it is generally chosen by vessels of war. The usual way of approaching it is from the northward, round the west end of the reef. The latter may be passed by the eye or by bringing the dwelling house of Green Cay Estate (on a mound near the shore) in a line with Sight Mill, bearing S. 13° W. (S. 14° W. mag.). The mill stands on the center ridge of hills—which is here lower than elsewhere—and has neither head nor vanes. In running in upon this mark, however, the vessel will cross over 27 or 28 feet water and then deepen to 7 fathoms SW. of the island. Soon after passing within the edge of the bank, she may haul up for the anchorage and anchor when the east point of Buck Island comes open of the sandy point on its south side.

Buck Island Channel.—From Green Cay the shore of St. Croix is skirted by a reef all the way to the east end. Within it there is snug anchorage for small craft which find their way through a small cut north of Coakley Bay Mill and warp up. With good local knowledge a vessel may enter Buck Island Channel from the SE. by running in between the island and the reef skirting St. Croix, keeping the north extreme of Green Cay in line with Mount Eagle S. 84° W. (S. 85° W. mag.). The latter from this direction will appear the left of two hills, apparently very nearly of the same height; the northern one is Salt River Mound, rising near the shore 2 miles farther eastward. The least water will be 6½ fathoms, the depth generally being 10 fathoms; but great care must be taken to keep the leading mark on until the vessel is abreast of Buck Island, when she may haul to the northward.

Lang Bank.—An extensive bank of soundings stretches off from St. Croix, curving round Buck Island Reef on the north and west, and passing at about ⅛ mile north of the Scotch Bank at about 1¼ miles from the shore. On its extreme edge there is one of those remarkable wall-sided narrow coral ledges, which, commencing about 3 miles N. 78° E. (N. 79° E. mag.) of Buck Island Reef, sweeps round in a convex form outward at the extreme east end, and terminates 2 miles from the east end of St. Croix; the northern part has a depth of from 6 to fathoms on it; the southern portion has from 8 to 10 fathoms on it, a in the space between there are from 12 to 17 fathoms.

The shoalest part of the northern ledge bears N. 73° E. (N. 74° mag.) from Buck Island, and N. 50° E. (N. 51° E. mag.) from the e end of St. Croix, and in heavy weather it breaks and becomes d gerous; it is therefore advisable, under such circumstances, if com

from the southward, not to approach the east end within 12 miles, and not to bear up before Buck Island bears S. 67° W. (S. 68° W. mag.).

South Coast.—The south coast of the island is bordered by a dangerous broken coral reef, which extends from the east end to nearly abreast of Long Point, 3½ miles from the SW. point of the island, where it terminates in the Southwest Shoal, which has only one fathom water on it, with Long Point bearing N. 32° W. (N. 31° W. mag.), distant nearly 1¼ miles. The most dangerous part is from the latter point to Signal Hill, 8 miles to the eastward, where it runs along shore more than 1½ miles off. It generally breaks, and as several shallow patches exist outside it should be cautiously approached. There are several cuts through the reef, capable of admitting small coasters into tolerable anchorage within. One of the best is off the entrance of Krausse Lagoon. At Great Pond Bay there is a narrow cut leading into safe anchorage for vessels of 10 feet draft.

Frederichsted.—The west end of St. Croix forms a bay, and near the center of its shores is the town of Frederichsted. In front of it there is good anchorage in from 6 to 7 fathoms of water, with the fort bearing S. 80° E. (S. 79° E. mag.), and Southwest Point S. 16° W. (S. 17° W. mag.). The edge of the bank is not more than ½ mile from the shore, consequently in the hurricane season the anchorage is unsafe. Should the wind blow from the westward, as it sometimes does during the fall and winter months, a heavy swell rolls in, making the anchorage uncomfortable and landing difficult.

Shallow water extends ¼ mile from the north point of the bay and nearly a mile southward of Southwest Point, the SW. extreme of the island. In rounding the latter point carefully with the lead in not less than 6 or 7 fathoms water at the distance of a mile, a vessel should not haul in until the north point bears N. 10° E. (N. 11° E. mag.). The edge of the bank lies nearly 3 miles SW. of Southwest Point, and terminates abruptly; within it is a narrow coral ledge of 7 to 9 fathoms.

There are three small wharves near the customhouse, at either of which landing is easy.

The population is about 2,500. The town is clean and well kept. The temperature is from 80° to 90° F.

The port charges as the same as for Christiansted.

The United States is represented by a consular agent.

Provisions can be obtained at a cost of 30 to 50 per cent more than in the United States.

Water can be had from the export wharf at a cost of half a cent per gallon. The water is collected in cisterns and then pumped.

Coal.—A small amount of coal can be had at a cost of $9 per ton.

Hospitals.—There are two in one building, a civil and a military hospital. The cost is from $2.50 to $3 per day. Quarantine is maintained. The quarantine flag is green.

Telegraph.—There is communication with Christiansted both by telegraph and telephone.

Lights.—Two fixed white lights are exhibited from iron posts at the end of the center pier, visible 2 miles.

Winds.—There is no regular land breeze at St. Croix, but when the trade wind is light during the day it generally falls calm during the night. Northers, with the accompanying heavy ground swell, do not appear to reach this island.

Tides.—No perceptible tidal stream has been observed at St. Croix, but a rise and fall takes place of from 4 to 8 inches, according to the strength of the wind, which will sometimes raise it to 18 inches. Between this island and St. Thomas a slight easterly current has been observed. High water, full and change, at 7h. 30m.

CHAPTER XII.

THE WINDWARD ISLANDS—SOMBRERO TO ANTIGUA, INCLUSIVE.

SOMBRERO.

Sombrero Island.—The lighthouse on Sombrero is in latitude 18° 35′ 37″ N. and long. 63° 28′ 13″ W. The island is 1800 yards long and 400 yards broad, and at its north end it is about 20 feet high; from thence it ascends gradually to the middle of the island, where it attains the height of 40 feet. Its surface is exceedingly rough and rises in sharp jagged points. The crevices between appear to have been scooped out by the rain and sea water dissolving the coral rock of which the island is composed. The vegetation consists of a few small beds of prickly pear. Fish of indifferent quality may be caught in large numbers off the island. Several veins and some large deposits of phosphate of lime are worked by a company. The island belongs to Great Britain.

The sides of this island are precipitous and rocky, and quite inaccessible except at a little bight on its west side, ¼ mile from the south end, and a short distance to the southward of a small rock awash, where under very favorable circumstances, by watching an opportunity, a person may jump on to a flat ledge of the cliff, and with some difficulty ascend to the summit. It lies on a small bank of soundings, which extends to the eastward 2½ miles, with 22 fathoms on its edge; to the southward 1½ miles with 47 fathoms at that distance; to the westward 1¼ miles, with from 14 to 24 fathoms; and to the northward 1½ miles with 27 fathoms, coral crust.

From the island the high land of St. Martin is distinctly seen in clear weather distant 40 miles. Dog Island bears from it S. 35° E. (S. 33° E. mag.) 21 miles, and the north end of the Anguilla Bank S. 80° E. (S. 78° E. mag.) 24 miles.

Light.—On the SE. side of the island is an open iron frame-work tower, painted red, from which is exhibited a revolving white light, 150 feet above the sea, which attains its greatest brilliancy every minute and should be visible 20 miles.

Anchorage.—There is anchorage on the west side of the island in 6 and 7 fathoms close to the rocks, also in from 10 to 14 fathoms, and heavy moorings are laid down for the vessels that ship the produce of the quarries. The prevailing winds are from NNE. to S by E.; westerly winds seldom blow home.

ANGUILLA.

Anguilla Island is 14 miles long, and the eastern half is from 2 to 3 miles broad, but the western portion tapers gradually away to a point. It has an area of about 35 square miles, and the population is 3,700 (1891).

The eastern portion of the island is the most elevated, and in the neighborhood of Crocus Bay, near the center of the island, it is 213 feet high, but it has no remarkable hills. The western portion declines gradually, and at the end it is only 30 feet high. The southern side is generally much lower than the northern, and as far westward as Rendezvous Bay it is fringed with a coral reef, dry in many places, from 200 to 400 yards from the shore, and steep-to. There are, however, several little cuts through it, which will admit boats of large size into good shelter. The island belongs to Great Britain and the chief magistrate resides at Crocus Bay.

Rendezvous Bay, on the southern shore, affords good shelter to small vessels. In entering the bay give a berth to the reef, which extends ¼ mile off Shaddick Point, the eastern limit of the bay. It can be seen from aloft. From Blowing Point, about a mile eastward of Shaddick Point, there is a road leading to the two anchorages, Road and Crocus Bays on the western coast.

Blowing Rock is a small rocky islet, about 6 feet above the sea, lying S. 58° E. (S. 56° E. mag.) ¾ mile from the west end of Anguilla; it is bold and steep-to outside, but within it there is only a channel for boats.

Anguillita is a small rocky cay, 20 feet high and covered with brushwood, lying ¼ mile S. 66° W. (S. 68° W. mag.) of the west end of the island, to which it is almost connected by coral heads, leaving only a passage for boats. It is bold and steep-to on its SW. side.

South Wager is a small barren rock, about 20 feet high, lying about 400 yards from the northern shore of Anguilla, at 1¼ miles from its western end, which is here formed of remarkable low cliffs. The rock comes conspicuously in sight after rounding Anguillita, and is steep-to.

From abreast the South Wager, the shore to Mead Point, at the east end of Long Bay, is clear, and may be approached freely. From Mead Point to Road Bay, 2¼ miles eastward, the coast is composed of remarkable perpendicular cliffs, 150 feet high.

Dowling Shoal.—The Dowling Shoal is about 1½ miles in extent east and west, and ¾ mile north and south. Its western edge lies north of Mead Point, and the channel between, which is about ¾ mile wide, c ries a depth of from 6 to 9 fathoms. Small vessels leaving Road I may run through it, but in beating up from the westward it is bet to keep outside the shoal. Fork Mountain, in St. Martin, open west Mead Point bearing S. 30° E. (S. 28° E. mag.), leads nearly ½ mile w ward of the shoal.

Dowling Islet.—On the northern edge of the shoal there is a sm rocky islet of the same name, which is awash with no part show

above water. It is steep-to on the NW., but foul to the distance of ¼ mile to the NE. At nearly ½ mile S. 69° E. (S. 67° E. mag.) of the islet, on the eastern edge of the shoal, is a small low sandy cay, called Sandy Island, covered with brushwood to the height of 6 feet; there is no safe channel between, and to the south and SE. it is foul for more than ⅓ mile.

Road Bay is a small bight about ¾ mile deep, affording good anchorage for small vessels. It is the best and safest anchorage in the group, with excellent holding ground. On the narrow ridge of sand at the head of the bay there is a small village, and back of it an extensive salt pond. There is no danger in the bay. The bluff point to the northward is steep-to, and a vessel may anchor as convenient.

Water and provisions may be had at all times.

Crocus Bay is formed by perpendicular white wooded cliffs. The bay is limited to the northward by Flat Cap Point, so called from its terminating in a small flat topped rock.

The principal settlement is in the SE. corner of the bay, and the houses are scattered about the valley and adjacent hills. The customhouse, with its flagstaff, stands on the south side of the bay, on the summit of a hill 218 feet high, the loftiest in the island. The best landing place is a little to the northward of the road leading up the valley, but there is always a heavy surf on the beach.

In the middle of the bay and S. 45° W. (S. 47° W. mag.) about ¾ mile from Flat Cap Point is a coral patch with 5 fathoms over it.

The United States is represented by a consular agent.

Supplies.—Fresh provisions and firewood may be obtained at Crocus Bay, but no water. Yams are abundant and of excellent quality.

Pilotage is not compulsory. Charges moderate, from $4 to $6 per vessel.

Dues.—No light dues. Tonnage dues on vessels less than 30 tons collected once a year at the rate of 24 cents per ton registered measurement. Over 30-ton vessels pay package dues at the rate of 24 cents per ton of the cargo landed. Vessels loading salt are exempt from any dues.

Anchorage.—A good berth will be found with Flat Cap Point bearing N. 21° E. (N. 23° E. mag.) and the customhouse S. 52° E. (S. 50° E. mag.) in 7 fathoms water, sandy bottom, and excellent holding ground. The bay is open to the westward, but winds seldom blow from that quarter. Heavy rollers, however, frequently set in with violence, making the anchorage rough and landing difficult.

Directions.—A stranger bound to either Crocus or Road Bay had better run to leeward of Dog Island and beat up. If from the east or SE., run through the clear bold channel between Anguilla and St. Martin, haul round Anguilla, and act in the same way. There will be no difficulty in doing this; there is seldom any current; the water is smooth, and if overtaken by night good anchorage will be found any-

where under the south side of the cays and reefs NW. of Crocus Bay, taking care, however, to avoid the Dowling Shoal. Vessels when leaving the bays and bound to windward, with the assistance of a pilot, may take the northern channel.

Current.—A strong weather or easterly current will sometimes be found in Crocus Bay, to which a vessel will swing even in fresh winds, but there is no perceptible tide.

Northern Channel.—This opening is between the east end of Seal Islands Reef and Flat Cap Point, and is 1¾ miles wide. Nearly, however, in the center, but rather nearer Anguilla, there is a dangerous, narrow ledge, named Middle Bank, ½ mile long, on which the depth is from 20 to 24 feet. The bottom is distinctly seen on this bank, and with the heavy sea, which generally prevails here in the winter season, it frequently breaks, and becomes dangerous, as no good marks can be given, although there is a clear channel on either side.

The south side of the east end of the Seal Islands Reef breaks in heavy weather, and is steep-to, but foul ground extends out ¼ mile from its NE. side, and is extremely dangerous. If approaching from the northward, with the view of using this channel, bring the customhouse in line with the western peak on St. Martin, which mark leads about a mile to windward of Seal Islands Reef, and 400 yards eastward of the middle bank.

Shawl Rock.—Two miles eastward of Flat Cap Point the west end of a dry reef commences and trends to the northeastward at nearly a mile off shore, and at 4 miles from the point and ½ mile outside the main body of the reef there is a dangerous rock, named Shawl, which does not always break, and is steep-to. The shore then continues foul to within a mile of Snake Point, the NE. end of Anguilla. In beating up the vessel's safety will be insured when approaching this reef and rock by proper attention to the lead, for here the 20-fathom line of soundings runs along at 1½ miles from the shore, decreasing suddenly.

Within the reef, at the west end, there is good shelter for a boat, and through a narrow intricate opening near the east end droghers find an anchorage.

Scrub Island is separated from Anguilla by a narrow channel of deep water about ¼ mile wide, but it should not be used, as its western side is skirted by a reef nearly dry to the distance of 200 yards, upon which a vessel may be forced by the sudden flaws which come off the lee side of all these islands.

This island lies on the same line of direction as Anguilla, and i miles long and ½ mile broad; it is covered with brushwood and stun trees, which at the west end are about 50 feet above the sea. The e end is low, and from it extends a narrow strip of low rocks to the dista of ½ mile; they are 8 or 10 feet high, steep-to, and in general the breaks violently over them, but in approaching them from the NE. t are hidden under the high part of the island, and are exceedingly d

gerous, for the soundings are so deep, the depth being 27 fathoms within ½ mile of them, that the lead will scarcely give warning.

Near the center of the north shore of Scrub Island there is a little hill of white sandstone, which, when the sun shines on it, is very remarkable. There is tolerable landing at the beach at the NW. end of the island, and good shooting.

Little Scrub Island lies about ¾ mile westward of the above hill and is equally conspicuous from the contrast in color, it being a barren precipitous black rock 40 feet high, and steep-to.

Dog Island is the westernmost of a group of small islets and cays extending westward from the NW. side of Anguilla. It is 1½ miles long, east and west, in the center ¾ mile broad, and about 80 feet high, and thence tapers gradually to points at its extreme ends. It is covered with brushwood and grass, affording pasturage to an excellent breed of horses and sheep.

The east end and south side of Dog Island are bold and steep-to. At 400 yards from the center of the southern shore there is a remarkable small black rock, named Bay Rock, 4 feet above the sea, and nearly abreast of it, just within the bluff rocky point which forms the south extreme of the island, is the landing place. The west end of the island is formed by a high, perpendicular cliff, and from it a broken ledge of rocks extends ¾ mile to the westward, terminating at a small, low, rocky islet, called West Cay, 6 feet above the sea, and steep-to on its west side.

From West Cay the ledge of broken rocks continues to sweep round the north side of the island to the east end. Near the center at ¼ mile from the shore, is Middle Cay, a remarkable, small barren islet, its NE. side being a perpendicular black cliff, 60 feet high. It stands on the edge of the ledge, and on the very brink of soundings; there is no bottom at 100 fathoms within a mile of it.

One mile to the eastward of Middle Cay and similarly situated is another small, low rocky islet named East Cay, covered with brushwood, and equally steep-to on its north side.

Caution.—In the daytime West Cay may be passed within ¼ mile without fear, but in the night it should be approached very guardedly, for the soundings are so deep alongside it that the lead will be of little use; within a mile of the cay the depth is from 17 to 20 fathoms.

Prickly Pear Cays are two small islets lying east and west of each other, and separated by a small boat channel. The western cay is a narrow rugged rock ¾ mile in length, covered with brushwood to the height of 25 feet, upon which there is no landing. The eastern cay is a little lower, slightly wooded, with sandy shores, and about ½ mile long and ¼ mile broad; landing may be effected here with care, in a little bight on the west side.

Dog Island Channel.—Between Prickly Pear Cays and Dog Island here is a clear channel 2½ miles wide, with a depth in it of from 9 to 10 fathoms to within ½ mile of the western Prickly Pear, when the sound-

ings become so irregular, that in strong winds, especially when accompanied by rollers, the sea tops and frequently breaks. It will, therefore, be always better to pass to the westward of Dog Island, except with a free wind and smooth sea.

Flirt Rocks are two small rocky islets; the northwestern, lying about ¾ mile northward of the Prickly Pear Cays, is 20 feet high, the other 8 or 10 feet. They are foul all around, but only to a short distance.

Seal Reef and Islands.—Seal Reef commences a little eastward of the Flirt Rocks, and continues unbroken to the eastward, where it forms the western side of the north channel into Crocus Bay, and is about 5 miles in length. On its north side it is bold and steep-to, and dangerous to approach in the night, for the soundings are not sufficiently regular to enable a vessel to come nearer than 4 miles; at this distance the depth is 18 fathoms; within that from 14 to 16 fathoms close up to the reef. The south side is composed of detached shoals and coral heads, which extend ¾ mile from the main body of the reef.

At about 1½ miles to the eastward of the Flirt Rocks are several low rocky islets, called the Seal Islands, about 5 or 6 feet above the sea.

North Wager is a small black square rock, about 3 feet high, lying on the south side of Seal Islands Reef, ¾ mile to the eastward of the Prickly Pear Cays. In beating up to Crocus Bay it serves as a guide when approaching the reef, and a vessel should not stand within or to the northward of it.

Anchorage.—To the southward of the North Wager, from Prickly Pear Cays to Crocus Bay, there is excellent anchorage in 9 or 10 fathoms water, over sandy bottom and out of the influence of the rollers.

Caution.—Anguilla and the small islands and cays just described are so low in comparison with St. Martin, that when approaching them from the northward at night, from their being backed by the high lands of that island, it is extremely difficult to estimate the distance from them; and in attempting to do so frequent accidents have happened on the north side of Anguilla.

Tides.—At all the islands of this group, viz, Dog Island, Anguilla, St. Martin, and St. Bartholomew, there is a rise and fall of from one to 2 feet, but the periods are so irregular that the exact time of high water can not be correctly defined. The following observations, made by Dr. Fahlberg, a resident of these islands for a long period, are valuable, and no doubt give the best information on the subject:

"About St. Bartholomew the flood at full and change runs SE., and it is then generally high water at 10.30 p. m., while the sun is farthes the north of the equator, but comes about two hours sooner in the s ceeding months, until the sun gets farthest to the south, when it is h water at 10.30 a. m., and it runs afterward in the same proportion b again. The winds, which are of long continuance, sometimes mak trifling difference. The sea is always lowest at the time when the s is farthest to the north, and the contrary."

During the surveys of these islands, which were conducted during the winter season, between the months of November and March, by Capt. E. Barnett, R. N., neither tidal stream nor current were detected, except on one or two occasions, when at anchor in Crocus Bay, on the north side of Anguilla, a strong easterly or weather set was observed; and on one occasion to the eastward of St. Bartholomew, after a long period of strong trade wind, a westerly set ran for a short time one mile an hour; but in general no difficulty was found in beating up from one island to the other.

ST. MARTIN.

St. Martin Island is very irregular in outline, the shores being deeply indented by numerous bays and creeks, some of which afford good anchorage. The north part belongs to the French, and is attached to the government of Guadeloupe, and the remainder to the Dutch.

The west end of the island terminates in a dangerous, low, sandy point. The NE. end is high and bold; and being separated from the main ridge by a deep, broad valley, when seen at a distance from the WNW. or ESE. it has the appearance of a separate island. The SE. end is formed by a high bluff, faced by a perpendicular white cliff, from which it receives the name of Blanche or White Point.

This island is of moderate elevation; the loftiest table ridge, which runs nearly through the center of the island north and south, being 1,360 feet high. Besides the table-land, it may be recognized by several remarkable and useful elevations. The Saddle, or Red Hill, at the west end of the island, although only 377 feet high, is a striking object when seen from the north of Dog Island. Morne de la Fortune, 293 feet high, on the east side of Simson Lagoon, forms a bold promontory and conical peak. The southernmost bare rocky peak of the western range of hills, 900 feet high, which when seen from the NW. and SE. resembles a colossal face leaning backwards, to the SW; and the little conical hill, 697 feet high, on the west side of Grande Bay, are all very remarkable. Population about 7,000.

Grande Bay, at the SE. end of St. Martin, is the principal anchorage in the Dutch quarter. The eastern side of the bay is a mile in length, and is formed by a lofty promontory, which terminates to the southward at Blanche Point; the western side is formed by a flat, narrow, rocky neck of land 104 feet high, and nearly 400 yards in length, connected to the main by a low sandy ridge, which, with the line of shore to the northward, makes this side nearly ¾ mile long. The entrance between the headlands is a mile wide, and free of danger.

At about ¼ mile NW. of Blanche Point is the beginning of a narrow sand bar, which leaves the shore and sweeps round the east and north sides of the bay at a distance of from ¼ to ½ mile, with from 6 to 10 feet water on it. Within it there is a narrow deep vein of from 12 to 15 feet water, and about ¼ mile from the western shore there is a cut in the

bar, where there is a depth of 11 feet. A small vessel will find this an excellent anchorage; but it will require the assistance of a pilot, as no marks can be given and the opening shifts.

There is a similar cut at the east end, but the wind under the high land is so uncertain that it is quite unavailable to sailing vessels.

At the head of the bay, on a low sandy ridge, is the town of Philipsburg, the seat of government. Large quantities of salt are shipped. The salt pond is back of the town.

The town contains about 2,000 inhabitants.

The United States is represented by a consul and a vice-consul.

Port Charges.—Certificate of measurements, $2; light dues, 1½ cents per ton. For vessels under 100 tons: Tonnage, 8 cents per ton; harbormaster, $2.60; wharfage, $1. For vessels over 150 tons, $1 more on each charge. Vessels taking salt pay no tonnage dues.

Light.—A fixed white light is shown on the site of old Fort Amsterdam. It is 115 feet above the sea, and visible about 10 miles.

Proselyte.—This very dangerous rock has only 2¼ fathoms on it and seldom breaks in the strongest winds. It is not more than 35 yards in extent with Blanche Point N. 44° E. (N. 46° E. mag.), distant 1¼ miles.

The south and SW. sides of this rock lie just within the 10-fathom line, and a ledge from 6 to 9 fathoms runs off to the distance of ¾ mile to the SE. of it, which serves as a warning when approaching it from that quarter.

Directions.—When approaching Grande Bay from the eastward round Blanche Point at the distance of ¼ mile, then haul up gradually into the bay, prepared to meet the eddy winds and sudden gusts which rush off from the highlands to the NE. and anchor in the center of it, in a depth most convenient to the vessel's draft, bearing in mind that within the depth of 5 fathoms the soundings decrease rather suddenly to 3½ and 3 fathoms.

In approaching the bay from the southward or in beating up to it from the westward great care must be taken to avoid the Proselyte Rock.

In standing in for Grande Bay from the southward, to windward of the Proselyte Rock, do not bring Blanche Point to the eastward of north, or open out the Oostenberg, a conical peak to the westward of the point, until within the rock.

In working up inshore from the westward, when approaching the rock, do not open Grouper Islet to the left or northward of the highest hill at the east end of St. Bartholomew. When leaving the anchorage and clear to the westward of the rock, the vessel may be hauled to the wind when the Grouper comes open to the northward of St. Bartholomew.

Pelican Point.—To the westward of Amsterdam Point the south shore of St. Martin is composed of small sandy bays, separated by

woody heights, steep-to, for the distance of 2¼ miles, where it terminates at Pelican Point, a low rocky point forming the east end of Simson Bay. From this point a narrow ledge, on which there are from 2 to 4 fathoms water, extends out ½ mile to the southward, and about 300 yards to the NW. of the point are the Pelican Rocks, 3 or 4 feet above the sea.

Simson Bay.—From Pelican Point a low sandy shore sweeps round to the westward, forming Simson Bay, with indifferent anchorage in the center of it, midway between the points, 4½ fathoms of water. At the east end of the bay there is a boat channel into the lagoon. Thence to the west end of the island the shore is low and bounded by sandy beaches, separated by low rocky and sandy cliffs.

Terre Basse Point is the western extremity of St. Martin. In rounding it in the nighttime great care must be exercised, as the spit, running ¾ mile WSW. from the point, is so steep-to that the lead will give little or no warning of its proximity. In the daytime the shoal may be seen from aloft. If the weather is so cloudy as to make it difficult to see the shoal, keep Fourche Island (lying 2½ miles NW. of St. Bartholomew) open to the southward of St. Martin till Terre Basse Point bears to the southward of east.

After rounding this point in proceeding toward Marigot Bay, do not come within the depths of 7 fathoms, as this part of the shore is fringed with reefs and sand banks to the distance of one mile from the shore.

Marigot Bay affords good shelter from the usual trade winds, but is open to the NW. and is exposed to the rollers which sometimes break ½ mile off shore, sending a heavy surf into the beach.

The Town of Marigot is situated at the head of the bay and is the seat of government for the French portion of the island.

Landing is inconvenient at all times, except at the extreme east end of the beach, at the foot of the Fort Hill, where there is a small wharf. Having effected a landing, the boat had better lie off at a grapnel to the eastward of Round Hill, which cuts the beach in two nearly in the center, and is very remarkable; the shore of the bay is skirted by a flat coral ledge.

Medée Shoal is the only danger in Marigot Bay. This rocky shoal is nearly circular, and 200 yards in diameter, having on its NE. edge as little as 15 feet of water, with from 20 to 24 feet to the SW. of it. It lies N. 80° W. (N, 78° W. mag.), 800 yards from Arago Point, and the channel between has from 3½ to 4 fathoms in it, but it is always better to pass outside the shoal.

Light.—A fixed green harbor light, visible 3 miles, is exhibited from a mast painted white, situated in the SW. corner of the fort; it is not visible when bearing southward of S. 25° E. (S. 23° E. mag.).

Directions.—In approaching Marigot Bay from the eastward, keep the Saddle or Red Hill, at the west of St. Martin, in one with the

north side of Marigot Bluff, bearing S. 41° W. (S. 43° W. mag.), until Round Hill comes in line with Morne Fortune Peak, S. 7° E. (S. 5° E. mag.), then haul in and anchor on this line, or a little to windward of it, in 4 fathoms of water, with Marigot Bluff bearing S. 77° W. (S. 79° W. mag.), or the Crole Rock, just open of the land to the northeast; it is not advisable to go farther in, unless in small vessels, when a berth may be taken up according to draft, being guided by the chart.

When beating into the bay from the westward it will be better to keep in the offing until this latter mark comes on, as the breeze will there be found more steady.

Crole Rock.—From Arago Point to North Point the shore is clear and steep-to, the soundings regular, and it may be approached to ½ mile. The most remarkable object on this part of the coast is the Crole Rock, a small, barren, black, rocky islet, with a rounded summit, rising on its north side 120 feet perpendicularly from the sea. It lies about 1¾ miles westward of North Point and 400 yards from a point adjacent to the rock, almost equally remarkable, from its terminating in a detached conical peak of somewhat greater elevation.

Grand Case Bay is a deep sandy bay to the southward of Crole Rock, and is a secure anchorage for droghers. In entering it they are guided by the eye. From the head of this bay an extensive low valley, in which there are several cultivated salt ponds, runs across to Orient Bay, on the opposite side of the island.

North Point.—The north point of the island is skirted by a reef for 400 yards; it always shows itself and is steep-to.

Orient Bay lies about 1¾ miles southward of North Point, and its entrance, about ½ mile wide, is between two small islands surrounded by dry reefs. From Pinels, the northern island, the reef extends off to the distance of nearly ½ mile. The bay is about a mile deep, and vessels sometimes visit it with the assistance of a pilot, but being exposed to the full force of the trade wind and heavy sea, it is only secure for droghers or small fore-and-aft vessels, which find shelter at both ends of it. From the southern island the shore becomes foul and dangerous as far to the southward as abreast Guano Cay; nearly midway, however, there is a small cut leading into a well-sheltered creek, called the Oyster Pond.

The Oyster Pond has a depth of 10 feet, and small vessels lie up here in security during the hurricane season. The channel is so narrow and crooked that it can only be navigated by the most expert pilots, and then only under favorable circumstances.

Caution.—In general the sea is so heavy on the east side of Martin that the shore should not be approached by large vess within the line of the adjacent islets, except in case of necessity.

Tintamarre Island (called also Hat or Flat Island) is a small un habited island lying 2 miles eastward of the north point of St. M tin.

The north side is formed by a bold rocky cliff, topped with trees, which toward the east end rises almost perpendicular from the sea to the height of 90 feet, and when seen from the eastward is very remarkable; its south and west sides are low and sandy. It is bordered on all sides but the west by a coral reef, which extends ¼ mile from the north shore and ½ mile from the south, and terminates at that distance at the SW. point of the island. There is tolerable landing in the sandy bay at the west end, and a small vessel will find temporary anchorage at about ½ mile from this part of the shore in 8 or 9 fathoms of water.

Spaniard Rock.—The channel between Tintamarre and Pinels Island Reef is obstructed by the Spaniard Rock, a small, dangerous coral head just beneath the surface. In moderate weather it does not show itself, but with a fresh breeze the sea breaks heavily on it. The channel should not be attempted except from absolute necessity.

Vessels running or beating through the channel between St. Martin and Anguilla have only to be careful when approaching this danger not to shut in the Crole Rock.

The Channel Between St. Martin and St. Bartholomew is free from hidden danger, but is not safe to navigate during the night, as many of the small rocky islets are quite low, and being steep-to the lead gives no warning of their vicinity.

Guano Cay is nearly ½ mile from the nearest shore. This is a small rocky islet rising almost abruptly from the sea to the height of 100 feet, and is slightly wooded. It is bold-to on its SW. and SE. sides, but nearly ½ mile to the NE. of it there are two small rocks just above water, over which the sea breaks heavily.

The Mollibeday Rock is similar in form and appearance to Guano Cay, and its rocky sides, partially wooded, rise abruptly to 100 feet above the sea. It is foul on its SE. side to the distance of ½ mile; and S. 69° E. (S. 67° E. mag.) ¼ mile from it, there is a small ledge of rocks a little above the surface of the water, which always show themselves by the breakers.

There is a clear channel ¾ mile wide, between the Mollibeday and the Hen and Chicks, and also between it and Guano Cay; but they should only be used in case of necessity, especially the latter, which is about ½ mile wide.

The Hen and Chicks are the outermost rocks on the west side of the channel between St. Bartholomew and St. Martin, and lie N. 77° E. (N. 79° E. mag.) 2 miles from Blanche Point. They are a cluster of small rocks; the south westernmost is 15 feet high, but the others are not more than 4 feet, and they are steep-to on all sides.

Fourche or Five Islands is the largest and loftiest in the channel. It is elbow shaped, the northern arm ¾ mile long, the eastern arm ½ mile, and it is about 400 yards broad. The latter name is given to it in consequence of its having five small peaked hills, which at a certain dis-

tance have something the appearance of being so many small islets. The two western hills are 349 feet high, the others a little lower, therefore at a still further distance they will be seen as two islands. At the east, and also at the west end, there is a small detached rock lying a short distance from the shore, with a ledge nearly dry between. At about 200 yards westward of the south point there is also a dangerous small rock, which just shows itself above water; with these exceptions it is bold and steep-to.

Anchorage.—There is anchorage off the SW. side of Fourche, where a vessel will ride with ease and safety during the prevailing winds; but it will be prudent for a sailing vessel not to go farther into the bight than about midway between the ends of the island, with the south point bearing S. 81° E. (S. 79° E. mag.); closer in, the wind becomes baffling and unsteady. A vessel of large draft, in case of necessity, wishing to repair damages, may haul in close under the eastern arm, passing westward of the small rock just noticed. There is good landing in the sandy bay at the NE. corner.

Table Rock lies N. 46° W. (N. 44 W. mag.), 1¼ miles from Fourche Island, with a clear passage between. This is a small rocky islet, nearly barren, and when seen from the north or south has somewhat the appearance of a shoe, with the heel to the westward, where it is 25 feet high; it is clear all round, and may be approached on its west side within ¼ mile.

The Great Grouper is a rocky barren islet, almost circular in form, about 300 yards in diameter, and very much resembling in appearance the Mollibeday Rock. It rises abruptly on all sides, and terminates in a rounded summit, 150 feet above the sea. A coral ledge of dry and sunken rocks extends to the distance of 200 yards from its south side, leaving a narrow vein of deep water between it and the Little Groupers; from all other quarters it may be approached within ½ mile; and the channel between it and Table Rock may be navigated freely.

The Little Groupers form a cluster of small, detached, black, barren rocks, the southernmost lying S. 21° W. (S. 23° W. mag.) ½ mile from the Great Grouper. This and the northernmost rock are about 15 feet high, but the intermediate ones are much lower; they are steep-to on all sides.

Boulanger Island, lying eastward 1½ miles from Fourche Island, is a small barren, rugged, rocky islet about 50 feet high; rising abruptly from the sea on all sides. About 400 yards eastward of it will be seen a remarkable pillar-shaped rock, nearly of the same height, which, from its resemblance to a vessel under sail, is called the Sail Rock. Both bold and steep-to, and cannot be mistaken.

Beef Barrel is a small square black rock, only 14 feet above the s lying west nearly 1½ miles from Colombier Point, the NW. end of Bartholomew, with a clear channel between it and the 4-fathom pat about ½ mile off Colombier Bay. It is bold and steep-to on all sides t the NW., which is foul to the distance of 200 yards.

ST. BARTHOLOMEW.

St. Bartholomew Island (frequently called St. Barts) is a French possession, being ceded by Sweden to France in 1878, with a population of about 2,800.

The exports are unimportant, the commerce depending chiefly upon the port being free.

The island is of irregular shape, the coast line being indented with numerous small bays, separated by rocky headlands. The hills are, compared with the high land of other islands, only moderate in height. Near the east end are three hills, of about the same height, so placed with regard to each other that when seen from a distance on the bearings SSW., W. by S., NW. by W., and their opposites only two of them can be seen.

The north and east sides of the island are fringed, to a short distance from the shore, by a coral reef which always shows itself; and off its sides are several small rocky islets, which it will be necessary to describe, as they interfere with the navigation of the channels, especially those on the south side of the island.

The Sugarloaf, lying off the western side of St. Bartholomew, is a remarkable, small, barren, rocky islet having the exact form its name imports when seen from any direction, and although similar in appearance to the Grouper Rock, its position and greater elevation readily point it out. It is an excellent guide to strangers for finding the entrance of Gustaf Harbor, which, from a distance, is not easily made out. It is high, bold, and steep-to, except on the north side, whence a narrow ledge of dry and sunken rocks extends 400 yards in that direction; at its extremity there are two small rocks about 4 feet out of the water, bold and steep-to outside.

Gustaf or Gustavia is the seat of government and a free port.

The only portion of it, however, that can be called a harbor is the inner part, or little arm of the sea, named the Carenage, on the shores of which the town is built; but it will only admit vessels of 5 or 6 feet draft. At the entrance to the Carenage vessels of from 8 to 12 feet may lie. The outer harbor or bay is a commodious and safe anchorage, with the prevailing winds, for a few vessels drawing not over 17 feet; but, being exposed to the south and west, it is not secure in the hurricane season. Vessels of larger draft will find temporary anchorage under the SW. side of the island, between the Syndare Islets and the west end.

Port charges, including port captain's fees, do not exceed $5 for a vessel of 500 tons.

The South Channel, 400 yards in width and having 6 fathoms water, lies between the Saintes and the Syndare islets; the former are three small, low, rocky islets, about 400 yards from the shore; outside they are bold and steep-to, but inshore a ledge extends toward Fort

Oscar Bluff, leaving a passage not 100 yards wide. The two Syndare Islets, lying north and south of each other, are barren, rugged, and separated by a coral ledge about 100 yards long; the northern islet is 98 feet high, and a ledge extends for about 400 feet from its north and east sides, and is not easily seen except when the sun is shining; a ledge also runs out 100 yards from the SE. end of the southern islet, and upon it are two small, rocky islets; the outer one rises from the edge of the ledge, and is bold and steep-to.

The West Channel, formed between the Syndare and the shore, is about 700 yards wide, and the only danger in it is the shallow ground before noticed, off the north end of the Syndare.

Directions.—Vessels bound to Gustaf from the eastward, or intending to proceed to the southward of St. Bartholomew, should not bring the east end of the island to bear N. 2° W. (north mag.) before they have opened out the Sugarloaf to the southward of Nègre Point, to avoid the Roques. With the prevailing wind the South Channel is the easiest to enter. In taking this channel, pass close westward of the Saintes, and anchor according to draft.

Should the wind be at east, if well maneuvered, the vessel may fetch into a berth. Should it be northward of east it becomes so variable and unsteady, and rushes down with such violence, that the greatest attention is requisite to keep the vessel well under command to insure staying. If the Syndare is weathered, she may stand boldly toward the shore, as far as is necessary to enable her to fetch into a berth, according to her draft. If not, there is room to make a short tack to the eastward, but a stranger without a pilot had better avoid this risk by using the West Channel.

In taking the West Channel, if coming from the eastward, the vessel may pass either outside the Sugarloaf or between it and the Syndare Islets; if the latter route is taken, haul close round the west side of the Whale Rock—which is small, dangerous, awash, and steep-to, lying nearly 400 yards westward of the Syndare—and tack when necessary under the shore, which is free of danger. There is a clear and deep channel between the Whale and the Syndare Islets, but the wind is so uncertain that it will be better to pass outside. A pilot is always at hand. The rise and fall of tide depends on the wind.

Colombier Bay, at the NW. end of St. Bartholomew, also affords shelter and tolerable anchorage; there is a patch of 4 fathoms near mid-entrance. In the bight of St. Jean Bay on the north side of the island there is also a narrow cut through the reef which will adn coasters.

Fregatte and Goat Islands are of considerable elevation, cloth. with grass and low brushwood, and readily distinguished. The latt is separated from the NW. end of St. Bartholomew by a clear chann ¼ mile wide, but the sea is generally so heavy that it should not be tempted except in a case of necessity.

Toc Vers is a small, pointed, rocky islet. When seen from the east or west its north point resembles a lofty pillar standing close by the side of the perpendicular cliff, which is about 120 feet high and very remarkable. It is steep-to on its north and east sides.

The Tortue is a small flat-topped rocky islet, lying ¼ mile from the NE. point of the island, to which it is connected by a ledge of rocks, dry in places. A quarter of a mile to the NE. of this islet are the Grenadiers, a small rocky ledge only 2 or 3 feet above water, on which the sea breaks heavily; it is steep-to on the NE. side.

Coco, the southernmost of the islets off the SE. side of St. Bartholomew, lies south, about ½ mile from the bold, high bluff which forms the east side of Grande Saline Bay. It is a narrow, rocky islet, slightly wooded on its summit, and has a small rock nearly connected to its north end; the islet is steep-to on all sides, particularly at its south end, but it is not advisable to pass inshore of it.

The Roques, or Little Turtle Rocks, are two very small rocky heads lying close together, ¾ mile to the eastward of Coco Island. They are only 3 or 4 feet above the sea, and although bold and steep-to are dangerous in the night, being nearly 1½ miles off shore. Inshore of them is the Fournis Reef, with a deep channel between, but it will always be better to pass to the SE. of them.

Grand Saline Bay, to the NW. of Coco Islet, affords temporary anchorage for small vessels. At the bottom of this bay are great salt marshes, the working of which has been partially abandoned. Thence to the SW. of St. Bartholomew the shore is bold and steep-to, and there is no danger but that described.

SABA.

Saba Island is a Dutch possession; it rises 2,820 feet perpendicularly from the sea, but its summit is generally in the clouds. It is nearly round in form, 2¼ miles in diameter, bold and steep-to. The 100-fathom line of soundings is about ½ mile from its west side, and only 600 yards from its east side. The island is a mass of rugged mountains, with deep and precipitous ravines, through and over which are only foot-paths from house to house.

The principal village is situated in what the inhabitants call the Bottom, a small valley 960 feet above the sea, and is only visible when Ladder Point, the SW. point of the island, bears N. 12° W. (N. 11° W. mag.). The only commerce is in poultry and vegetables, particularly sweet potatoes, which are raised in great abundance, and exported to the neighboring islands. The islanders speak the English language, and are excellent shipbuilders, and their boats and small craft being famed all over the Windward Islands, their model is generally adopted.

The principal landing place, called the Southside Landing, is about 800 yards eastward of Ladder Point, and is merely a little rocky cove

on the coast, at the foot of a deep ravine, through which a pathway leads up to the village.

There is another landing about ¾ mile northward of Ladder Point, called Ladder Landing from its being at the foot of a pathway traced out of the rugged precipice, which rises almost perpendicularly out of the sea. In general a heavy surf breaks all along the shore, and renders landing extremely difficult and often dangerous.

A landing may be effected with the prevailing winds, when moderate, about ½ mile to the southward of Torrens Point, the NW. extreme of Saba. This is the principal boat building spot. There is a well near it, but the water, although drinkable, is not good; the inhabitants chiefly depend on rain water, caught in tanks. Vessels might obtain a supply from the well, but it would be attended with very great difficulty and risk. Firewood can be purchased, but it is requisite to bespeak it, and agree to have it brought down to one of the landings.

The anchorages off Saba are neither commodious nor particularly safe.

Small sailing vessels or steamers may anchor temporarily off the Southside Landing. Another anchorage, where the bank of soundings is somewhat wider, is on the western side of the island, between Ladder Landing and Torrens Point. Here a vessel may anchor in 12 or 15 fathoms, sandy bottom, about 400 yards off shore, with the outer part of Torrens Point bearing N. 21° E. (N. 22° E. mag.).

Caution.—Sailing vessels should not attempt to anchor at Saba except in case of necessity, as the wind under the highland is almost invariably baffling and flawy.

Directions.—Should necessity compel a sailing vessel to take this anchorage, it had better be approached from the northward. After rounding the Diamond Rock (which is a remarkable, small, barren, rocky islet lying off Torrens Point, rising perpendicularly from the sea to the height of 80 feet, and very bold, for 200 yards), approach the anchorage under easy sail. When the north point of Saba is shut in with Torrens Point, and just before the Pilot Rock (which is 6 feet above water, and lies between the Diamond and Torrens Point) comes on with the western peak of the island of St. Martin, bearing N. 21° E. (N. 22° E. mag.), a vessel may anchor.

The bank here is very steep, and it will be prudent to lay out a kedge with a stout hawser to the westward, to prevent the vessel from swinging inshore by the eddying gusts from the mountain, and which will be found convenient to haul off by when getting under way.

Saba Bank forms nearly a parallelogram, its longest sides lyir ENE. and WSW. about 32 miles, and its shortest about NW. by and SE. by S. 20 miles. Its nearest part is 2¾ miles SW. of Sa Island.

The eastern edge of the Saba Bank is fringed with a remarkable na row ledge of living coral, sand, and rock, which is nearly 30 miles

length, varying in depth from 6 to 10 fathoms; when on this part the bottom is distinctly seen. It commences about SW. 4 miles from Saba Island, and trends thence to the SSE. for 11 miles, with a breadth of from 1½ to 2½ miles; it then turns SSW. for 8 miles, and is from one to 2 miles broad, and terminates W. by S. 12 miles farther on, where it is merely a ridge of 9 fathoms not ½ mile broad. To the westward, within this ledge, with the exception of a few small coral patches of 9 and 10 fathoms toward the southern edge, the bottom is clear white coral sand, with a depth of from 12 to 15 and 20 fathoms, gradually increasing to the edge, but terminating abrubtly in 30 fathoms. The bottom can be distinctly seen under a depth of 10 fathoms.

On the northern edge of the bank there is excellent fishing ground, but the Saba fishermen have frequently found the barracouta caught here, and on the bank between St. Christopher and St. Eustatius, *poisonous.*

Tides.—There appears to be no tide on the Saba Bank, and very little current was observed during the survey, which was made in the winter months.

ST. EUSTATIUS.

St. Eustatius Island, generally called Statia by the inhabitants, belonging to the Dutch, is lofty and volcanic; its summit, like that of Saba, is generally hidden by clouds. The island when seen from the NE. or SW., at a distance appears like two distinct islands. On the northern part are rugged hills; the southern portion is occupied by the volcanic mountain, on the southern side of which is a bold white cliff called the White Wall. The island has been a Dutch colony, with but little interruption, since the year 1600. The lieutenant-governor, who has Saba also under his control, is subordinate to the government of St. Martin.

The population is 3,500.

Products.—Formerly it was a place of some importance, but its trade now is insignificant. Yams are the principal articles of export, with some sugar, molasses, and rum.

Orange Town, the only town on the island, is on the western shore, partly on the beach and partly on the cliff above it, 130 feet high. The two parts, called the lower and upper town, are connected by a road cut in the face of the cliff. Fort Orange stands on a cliff in front of the town.

The only safe landing place is on the beach abreast of the town, and here the surf is frequently so heavy that the boat must be veered in with a long line from a grapnel.

Anchorage.—In approaching the anchorage, the only danger to be avoided is a rock, nearly awash, at the SW. end of the island, between the White Wall and the town.

The best anchorage is 700 yards from the shore, in 10 fathoms, sand,

with the church and Round Hill in one N. 72° E. (N. 73° E. mag.) and the SW. extreme of the island in one with Brimstone Hill (St. Christopher) S. 52° E. (S. 51° E. mag.).

The Wind hardly ever varies to the northward of NE. or to the southward of east.

Coast.—The northern part of St. Eustatius is bold, and may be rounded at the distance of 200 yards; but breakers extend from the SE. side, and in coming from either quarter it will be better to keep ½ mile from the shore, to avoid the baffling winds under the high land.

This island, with St. Christopher and Nevis, may be considered as a separate cluster, as they rise from a bank of soundings separated from the adjacent islands by channels of a greater depth than 200 fathoms.

ST. CHRISTOPHER.

St. Christopher Island, frequently called St. Kitts, is an English colony, and with the islands of Nevis and Anguilla forms the presidency of St. Christopher and Nevis. The climate of the island for a tropical one is healthy. The population is 30,800 (1891).

The island is of volcanic origin, the very remarkable peak of Mount Misery (generally in the clouds) rising to the height of 4,314 feet. It is nearly 18 miles in length, but so irregular in form as to vary considerably in breadth; it possesses no harbor and but indifferent roadsteads, quite unsafe in the hurricane season. At about 4 miles from its SE. end it is nearly divided into two parts by a low neck of sand, not ¼ mile across, and, consequently, at only a short distance it appears as two islands, and at a greater distance from the eastward or westward the irregular hills at the SE. end will appear as several detached islets.

The NW. end of the island is about 5 miles broad, and the center part is occupied by a vast rugged mountain ridge, its lofty summit terminating in Mount Misery. At the SE. end of the ridge, at the back of the town of Basse Terre, is a striking elevation called Great Monkey Hill, its rounded wooded summit being 1,319 feet high, and at the foot of the western side of the mountain, close to the shore, is Brimstone Hill, 779 feet high, equally conspicuous, and easily distinguished by the extensive fortifications and signal staff which crown its summit.

The SE. end of the island, although much less elevated, has some very remarkable hills, which, as before observed, are extremely useful when navigating between the islands, as they are always visible.

The edge of soundings is distant only from ½ to 2½ miles from t shores of the island; the NE. shore is here and there skirted by a re which in places affords temporary shelter for boats and droghe The bank which connects this island to St. Eustatius is from 4 to miles broad, with a depth of from 15 to 25 fathoms over coral sa and rock.

The Government consists of a governor, commissioner, an exe tive council, and a legislative assembly. The governor resides

Antigua; the seat of government is at Basse Terre, where the commissioner resides.

Basse Terre is clean and healthy, the sickly season being from September to November; population about 10,000.

The authority to call upon is the commissioner.

Salutes can be returned.

The United States is represented by a commercial agent and vice-commercial agent.

Anchorage.—The best anchorage is abreast the pier in from 6 to 7 fathoms. No directions are necessary, as there are no dangers.

Supplies.—Provisions can be had at fairly reasonable rates. Flour at from $6 to $6.50 a barrel; beef at $12 a barrel; bread at $3 a barrel; fresh meat at about 14 cents per pound.

Water is put alongside in puncheons at 60 cents per 100 gallons.

Coal can be had in small quantities at about $10 per ton.

The Cunningham Hospital, a government institution, is well kept. Sailors from all ships admitted at the rate of 60 cents per day.

Telegraph communication with United States and Europe and the West Indian Islands.

Communication.—There is steam communication almost weekly with New York and every two weeks with England. There is also communication with the West Indian Islands.

Port Charges.—Vessels of 30 tons and under pay 24 cents per ton once a year. Over 30 tons pay package dues on cargo landed, at the rate of 24 cents per ton, one hogshead or 8 barrels being computed as one ton. Ships calling for orders, water, or stores pay no charges whatever.

Stone ballast is put within reach of ships' tackle at 60 cents per ton; sand at 50 cents per ton.

Stevedore charges 18 cents per hogshead of sugar; molasses, 10 cents per puncheon; labor on board ship, 72 cents per day.

Cargoes are put alongside free. Inward cargo is landed by the vessel at a cost of about 3½ cents per barrel.

Lights.—A fixed red light is shown from a small wooden tower, 33 feet high, on the beach fronting the town of Basse Terre, and is visible 4 miles. A small red light is also shown on the mole head.

Old Road lies about 5 miles westward of Basse Terre, and a little eastward of the town there is a temporary anchorage in 9 or 10 fathoms water, stony ground, at 200 yards from the shore, abreast a river of excellent water.

There is also a similar anchorage a little northward of the small fort, at the foot of Brimstone Hill, with the flagstaff on the hill bearing N. 33° E. (N. 84° E. mag.), and the church N. 4° E. (N. 5° E. mag.); a convenient spot for steamers to land troops or supplies.

Caution.—Neither of these anchorages is, however, fit for a sailing vessel, as the wind under the high land is very baffling. In passing to

leeward of the island sailing vessels should keep at least 3 miles off shore to avoid being becalmed or exposed to the very violent gusts which frequently rush down without warning through the ravines.

In rounding the NW. end of St. Christopher in the nighttime a good berth must be given to Belltete or Sandy Point, as it is very low and is foul for ½ mile off shore.

Deep Bay.—The north end of the island has a reef about 1¼ miles long protecting the anchorage. The outer edge of the reef lies ¾ mile off shore, with shallow water a short distance outside of it. Deep Bay affords good anchorage for coasters.

The Narrows.—The channel between St. Christopher and the island of Nevis is called the Narrows. From the westward, against the trade winds, it can only be used safely by handy coasting vessels, as no leading marks can be given for beating, and the off-lying shoals are numerous.

There are also channels for coasters between these shoals and the shores of the islands, but no good leading marks can be given for them.

Anchorage.—There is excellent anchorage in the Narrows, with good holding ground in 6 fathoms of water, with the Cow Rocks bearing N. 55° E. (N. 56° E. mag.), Scotch Bonnet Head N. 13° E. (N. 14° E. mag.), and Horseshoe Point N. 57° W. (N. 56° W. mag.).

Directions.—The channel for vessels drawing 18 feet is between Booby Island and St. Christopher, and to the NW. of the Cow Rocks, a small cluster only 6 feet above the sea lying SW. of Booby Island and midway in the channel between Nevis and St. Christopher. The eastern entrance is obstructed by a dangerous bar of coral, which extends for upwards of 2½ miles northwestward from the north end of Nevis. A second patch lies 1½ miles N. 21° E. (N. 22° E. mag.) of Mosquito Bluff and about a mile from the nearest shore of St. Christopher.

The passage is between these shoals, on which the sea breaks in several places, and as the soundings give no warning, it is necessary to approach cautiously. For this purpose a vessel should keep an offing of at least 3 or 4 miles, and steer in with Nags Head, a remarkable peaked hill, in line with Mosquito Bluff, equally conspicuous, being a small perpendicular cliff 90 feet high, lying at the base of the lofty hills forming the SE. end of the island, bearing S. 52° W. (S. 53° W. mag.); when Lowland Church is just open to the westward of Booby Island S. 13° W. (S. 14° W. mag.), a vessel will be on the bar between the shoals, in 28 feet least water. Having crossed the bar run direct for Booby Island; pass 400 yards westward of it, and thence steer so as to pass to the northwestward of the Cow Rocks, at about the same distance westward of them there is no danger to fear.

NEVIS.

Nevis Island is lofty and volcanic, somewhat circular, 7 miles in length, 5¾ miles in breadth, and its area is about 20 square miles. The peak, with it crater, rises from the center of the island to the height

3,596 feet, but it is seldom visible. There are, however, several other elevations, which, being almost always unclouded, become most useful land-marks. On the south side of the island Saddle Hill, 1,432 feet high, may be readily made out from its features, except from the ESE. and WNW., when the hummocks are in one. The hill, however, from these points is equally conspicuous. On the east side of the island are two remarkable wooded peaks, standing on a fork of the mountain, 2,350 feet high.

On the NW. side, Hurricane Hill, 1,192 feet high, is easily known, being large and massive and terminating in a peak, and having at its base a small detached rounded hill, which forms a prominent bluff at the extreme NW. end of the island, 288 feet high, called Windy Hill. With the exception of this point and the base of Saddle Hill, the shores are low, and rise gradually to the interior, the plains and slopes being highly cultivated.

The island is an English colony and belongs to the presidency of St. Christopher. Population about 13,000 (1891).

Charlestown, the capital of the island, has in front of it an excellent anchorage with the prevailing winds, although an open roadstead.

Neither coaling nor provisioning facilities exist at Charlestown.

The United States is represented by a consular agent.

Pilots and Dues.—There are no regular pilots, and pilotage is unnecessary. Package dues are collected on all goods landed at the rate of 24 cents per ton. Vessels not over 30 tons pay tonnage dues as per register at the rate of 24 cents per ton once a year.

Directions.—Except on the west side, between Fort Charles and Cades Bay, the shore is fringed with a coral reef, and should not be approached within ¾ mile, or the depth of 10 fathoms.

In approaching the anchorage off Charlestown from the southward the lead must be hove quickly, as the 10-fathom line is less than one mile off shore and steep-to.

In the daytime, having rounded the south end of Nevis, if the island of St. Eustatius can be seen, keep it open of Brimstone Hill on St. Christopher. This mark will lead clear of the reef on the western side.

When Booby Island comes open of the north side of Nevis steer for it. This mark will lead just outside the ledge off Fort Charles, and to an anchorage at about ½ mile off shore, in 5 fathoms water, abreast the flagstaff in the town.

It is supposed that the shoal water off Fort Charles (in ruins) extends out much farther than the chart shows, as 5 fathoms have been attained one mile from the shore, the center of the town bearing N. 78° E. (N. 79° E. mag.)

Monkey Shoals.—Vessels of large draft approaching the anchorage off Charlestown from the NW. must avoid the Monkey Shoals, which are the only dangers on this side of Nevis, and lie N. 46° W. (N. 45° W. mag.) 4¼ miles from Fort Charles.

These shoals form two small banks of coral and sand, on which there are 4 fathoms water; they lie on the edge of soundings and occupy a space about ½ mile long, are 400 yards broad, and the discolored water over them may be seen at some distance from aloft.

REDONDA.

Redonda Islet is small and rocky, 1¼ miles long, ¾ mile broad and about 1,360 feet high. It is inhabited. Population 120 (1891). Phosphate is exported; labor can be supplied if required; fresh water and provisions in small quantities can be obtained; wild goats are plentiful on the northern end of the island. The prevailing winds are from the ESE. The only landing is at a small pier at the south end of the islet.

Anchorage is good in from 10 to 13 fathoms about 200 yards from the western side. Moorings are laid for ships to ride to, as the eddy winds cause a ship to swing constantly.

MONTSERRAT.

Montserrat Island, discovered by Columbus during his second voyage, was named by him from its resemblance to the mountain of the same name near Barcelona, which is rugged, uneven, and exhibits many lofty peaks, as its name in the Spanish language implies. The first settlement on the island was formed by the English in 1632, and is now a presidency forming part of the colony of the Leeward Islands.

Government is similar to that of St. Christopher.

Population is about 11,700 (1891).

Its products are sugar and lime juice.

The island is of volcanic origin, and its lofty heights, clothed with wood to their summits, may, when unclouded, be seen at a distance of about 45 miles; the highest is Soufriere Hill, 3,002 feet high. Its shores are bold, steep, and free of danger. Its east and NW. sides are precipitous, but the SE. and west sides slope gradually to the sea and are highly cultivated.

Water.—Many springs of excellent water flow into the sea; but on account of the surf, watering is attended with difficulty.

Anchorage.—The anchorage ground off Bransby Point is extensive, the depths moderate, and the holding ground good.

The anchorage off the town of Plymouth is not good, owing to the great depth of water, but the anchorage given on the chart is very good.

The best anchorage is about ¾ mile from Plymouth Wharf.

Plymouth.—The town is well built, and is the cleanest in the sm islands. The streets are paved; there is an excellent market pl with plentiful supplies for one ship at least, the mutton and potat being excellent. There is a very good wharf, and landing is as easy a Basse Terre, St. Kitts, or Nevis. With westerly winds, rollers prev

Montserrat is as good a port of call as any in the West Indies.

The United States is represented by a consular agent.

During the hurricane months a vessel should put to sea immediately on the approach of bad weather.

Light.—When the mail steamer is expected, a fixed light is shown from a staff on the beach in front of the town of Plymouth.

Pilots and Dues.—There are no regular pilots, and pilotage is unnecessary. There are no dues of any kind.

Tides.—It is high water, full and change, at Montserrat, at 6h. 0m. approx.; springs rise one foot 6 inches, neaps 6 inches, but they are irregular. Off the north and south points the western stream at times runs 2 knots, the eastern being weak; along its other shores it runs about half a knot.

BARBUDA.

Barbuda Island contains 580 inhabitants (1891).

It is attached to the presidency of Antigua.

It is only partially cultivated, but quantities of cattle, horses, sheep, and deer are raised, as well as corn, tobacco, and sugar.

The north, south, and west sides of the island are low, sandy, and scantily wooded, with nothing remarkable on them except on the south side, where about 2 miles from the SW. point there is an old martello tower, in a ruinous state, near the beach, and a little to the eastward of it a remarkable clump of trees, which are useful objects in approaching this side.

From Spanish Point, the north side of which is a white cliff 35 feet high, the eastern shore of the island begins to rise, and about midway, over a space of 2 miles, it is composed of perpendicular cliffs 200 feet in height, and is the highest part of the island. On this side a dry broken coral ledge skirts the shore at the distance of about ½ mile, upon which the sea breaks with great violence, and it is so steep that there is no bottom, with 90 fathoms 1½ miles outside it.

At the NW. end of the island the ledge is composed of detached coral heads, which do not break. Here, however, the soundings give warning of approach, and a vessel in the nighttime, when passing the west side of the island, should not come within the depth of 10 fathoms.

The west side of Barbuda is formed by a low, narrow sand ridge, scantily wooded, at the back of which is an extensive lagoon, carrying from 5 to 12 feet of water. The entrance to it lies a short distance to the eastward of Billy Point, at the NW. end of the island, but it is obstructed by a bar of mud.

The bank on this side extends for a considerable distance to the westward. This coast is foul in places for 2 miles off shore; vessels should not approach within the depth of 6 fathoms without caution.

The south side of Barbuda is by far the most dangerous, and must be approached with extreme caution, for the lead is of little use; indeed, in the nighttime it should be avoided, if possible, altogether.

This island is connected with Antigua by a bank varying in depth from 7 to 30 fathoms.

Supplies.—No good water can be procured at Barbuda. The inhabitants use rain water. Fresh provisions and wood can, however, be readily procured, and at moderate prices.

Anchorage.—There is excellent anchorage on the south side of the island to the westward, and under the lee of the shoals which shelter it with the wind as far to the southward as SE. The best position for communicating with the island will be found at about ½ mile from the shore, with the river fort bearing N. 10° E. (N. 11° E. mag.), and Palmetto Point N. 64° W. (N. 63° W. mag.), in 5½ fathoms. Be careful, however, when standing in, not to bring the fort to the northward of N. 10° E. (N. 11° E. mag.), until quite certain that the vessel is to the northward of the shoals.

Both this and the anchorage on the west side of the island are exposed to rollers; but, as they take the vessel in the stern, she is eased of the strain on her cable and rides far more comfortably than if at most of the anchorages about Antigua. At this period, however, landing is attended with great difficulty and risk, for, should the boat be thrown ashore broadside on, the next wave would inevitably destroy her. From a short distance to the westward of the river fort as far as the SE. end of the island the beach is skirted by small coral heads, with deep water between, through which the way must be picked to the landing. The clearest spot will be found abreast the fort.

Navigators undertaking to pass between Barbuda and Antigua in the nighttime should be very sure of their latitude, as the soundings are so irregular that it would be difficult to tell from them which way to steer.

ANTIGUA.

Antigua Island was discovered by Columbus on his second voyage in 1493.

It was first settled by the English in 1632, and, with the exception of a short interval from 1666 to 1668, has ever since been an English colony.

Population in 1891, 36,119. Area, 108 square miles.

The government consists of the governor, an executive council, and a legislative council.

The island is of moderate elevation compared with the lofty islands to the southward, so that the heights are but seldom obscured by clou

The shores are deeply indented, particularly on the NE. side, wh there are many bays and creeks navigable for small vessels.

This end of the island is low, but it rises gradually in height tow its SW. end, where the hills become very irregular and so remarkable to serve the purpose of guides through the dangerous reefs and sho which surround almost the whole island. The only clear space is the south side between Willoughby Bay and Old Road, where it is b

and steep-to. Elsewhere it should be approached with great caution and with the lead continually going.

Bank of Soundings.—Antigua lies in the middle of the southern edge of an extensive bank of coral and sand, which extends a little northward of Barbuda, on its NE. edge.

Shoal Ground.—On two different occasions 7¼ fathoms have been struck between latitudes 17° 04′ 04″ N. and 17° 06′ N. and longitude 62° 01′ W. and 62° 02′ 20″ W.

Green Island forms the east end of Antigua, the eastern extreme of which terminates in a bold, rocky headland, 170 feet high, called Man-of-War Point, which is steep-to and may be rounded at the distance of one mile. The sea generally rolls in so heavily that it should not be approached within this distance, and great caution should be observed when closing with Green Island either from the northward or southward.

Ten Pound Bay is nearly ½ mile to the SW. of Man-of-War Point, and is unnavigable from the heavy swell which always rolls in at the entrance. Ricket Harbor, at the SW. end of the island, affords shelter for droghers under the lee of the reef.

York Island is a small rocky islet, about 1¼ miles SW. of Man-of-War Point, at the south side of the southern entrance to Nonesuch Bay. This island is nearly connected by dry reefs to the shore of Antigua, which thence takes a SW. direction for 1½ miles, where it terminates in two bold, precipitous, rocky headlands 215 feet high, very remarkable from the eastward, especially when the morning sun shines on the white cliffs. In this space are the small bays of Marie Galante, Exchange, and Halfmoon. The shore is skirted by a reef, but in moderate weather it may be approached to a mile.

From Hudson Point, the southernmost of the above headlands, the coast takes a sudden turn about W. by N. for 3 miles, and then runs to the SSE. for 2½ miles, forming a deep bight named Willoughby Bay.

Willoughby Bay is capable of affording safe anchorage to large vessels, but is so difficult and dangerous of access that it is seldom visited, the produce of this part of the country being sent by droghers to St. John. The head of the bay is low and sandy, and its entrance is protected by a coral ledge, dry in many parts, through which there are two cuts, that to the NE. named Horseshoe Channel; the other is nearly 200 yards wide, but so crooked and intricate that no good marks can be given for its safe navigation.

Directions.—To enter Willoughby Bay by the Horseshoe Channel, run down about a mile off the reef, until Cochranes Mill, on the low land at the head of the bay, is in one with the low rocky point on the south side of Christian Cove, bearing N. 50° W. (N. 49° W. mag.), which mark will lead through the narrow cut; on the point there is the ruin of a small fort, 40 feet above the sea, but it is scarcely visible.

With the prevailing winds, vessels can not fetch out; and, as no safe

directions can be given for the other channel, the anchorage in this bay is only free to steamers, and they will require the assistance of an experienced pilot. The bay is exposed to the full force of the sea, which makes it even dangerous to approach in strong winds.

Shirley Heights is a remarkable, bold, rocky, promontory rising almost perpendicularly from the sea to the height of 545 feet. On the flat summit will be seen the barracks and other buildings formerly occupied by the garrison, but now abandoned and in ruins. Between Willoughby Bay and the heights are two small inlets, Mamora Bay and Indian Creek, which afford safe anchorage to droghers of small size; the entrance to the former is obstructed by a bar with 10 feet of water on it; the mouth of the latter is about 200 yards wide and has a shoal nearly in the center on which the sea generally breaks.

English Harbor, being entirely occupied by the government as a naval arsenal, is mostly visited by vessels of war, and is perfectly sheltered from all winds and sea. Water may be obtained with facility by hauling the vessel to the wharf, where it is conveyed on board through pipes. The harbor is very confined in space, and its turnings are so sharp that vessels of great length must warp in.

Vessels of 17 feet draft may moor alongside the northern wharf of the dockyard, with a bower anchor to the eastward; or, if wanting coal, alongside the eastern wharf, with an anchor to the southward, securing with her own hawsers or chains. There are 22 feet water close off this wharf. At times the tide ranges 3 feet, but it is very irregular.

There are no stores in the dockyard except coal.

Supplies are scarce and dear.

A sailing vessel should not attempt to enter the harbor with the wind to the northward of east, but should anchor outside and prepare to tow or warp in.

There are no hidden dangers, and for a steamer or sailing vessel undertaking to enter without a pilot it is only necessary to keep in midchannel. Long steamers will find it difficult to make the short turn round Barclay Point, and it will be more convenient for them to anchor in Freeman Bay, where moorings are laid down.

The wind generally moderates toward evening, and the land breeze in the early morning will enable a sailing vessel to leave the harbor without much difficulty.

Pilots and Dues.—Pilotage is compulsory on all vessels over 60 tons. Vessels of over 30 tons burden pay 18 cents per ton on all cargo landed or taken on board. Vessels under 30 tons pay 18 cents per ton regis once a year.

Beacons.—Two white beacons are placed on the eastern shore Freeman Bay and are the leading marks for entering the harbor.

Directions.—Intending to anchor in Freeman Bay, keep the abo beacons in line bearing N. 54° E. (N. 55° E. mag.), and let go port a chor when the white wall of the navy yard is in line with the we

end of the dockyard office, and secure with a hawser from the port quarter to the rock at Freeman Point.

To proceed alongside the yard, keep the leading marks on until within Barclay Point; in rounding this point to go up the harbor, do not approach the point until the extreme of black wharf, in the navy yard, is nearly in line with the NE. corner of the dockyard, then turn as sharply as possible.

Falmouth Harbor affords excellent anchorage for a few vessels of large draft; it is, however, never made use of, except by droghers. A sailing vessel of large draft would have to warp through against the prevailing wind.

The heads of the inner part of Falmouth and English Harbors are only separated from each other by a narrow, low, sandy ridge, about 200 yards across.

Pilots and Dues same as at English Harbor.

Directions.—Standing in for Falmouth Harbor from the eastward, having passed Shirley Heights, the entrance immediately shows itself, and a vessel may then steer boldly toward the center of the opening, until the east end of the ruined fort on Blake Islet comes in one with a remarkable house on the western slope of Monk Hill, bearing N. 7° W. (N. 6° W. mag.). This mark will lead through the entrance, and having passed the Bishop Shoal, which always shows itself, haul up and anchor as most convenient, according to the vessel's draft.

Aspect.—Westward of Falmouth Harbor is the loftiest part of Antigua, in many places the rugged, irregular hills rising abruptly from the shore, particularly between that harbor and Old Road Bluff. In the immediate vicinity of the harbor are two conspicuous elevations, which are frequently of great value to vessels navigating the north side of the island. The first is Monk Hill, on the north side of the harbor, readily distinguished by the fort and signal staff which crowns its summit, the SE. side overlooking a rocky precipice 695 feet above the level of the sea.

The other, on the NW. side of the harbor, nearly 1¼ miles westward of Monk Hill, is a much larger conical hill, thickly wooded, and rises to the height of 1,058 feet. When seen from the NE. and SW. its summit appears to terminate in a peak; but from the NW. and north, and points opposite it, forms two peaks, and is consequently sometimes named the Saddle Hill. It is also called Falmouth Peak, which seems a preferable name, as there is another hill called the Saddle.

In clear weather both Monk Hill and Falmouth Peak may be seen from Barbuda, 45 miles distant. The hills farther westward are higher, but, with the exception of Baggy Peak, slightly elevated above the adjoining hills, are not particularly remarkable.

Old Road Bluff, 2¾ miles westward of Falmouth, is a remarkable, bold, rounded headland, 135 feet high, steep-to, and easily recognized from the east or west, as it is then seen to stand out a short distance

from under the high land within it. Nearly midway between it and Falmouth Harbor, is Ding-a-Ding Nook, a small bay in which droghers find temporary shelter; the coast here may be approached within ½ mile. On the west side of the bluff the shore turns suddenly to the northward for ½ mile, forming the east side of Carlisle Bay.

Old Road or Carlisle Bay.—A sandy beach sweeps round the head of this bay, and terminates on its west side in a bold, rocky point, on which there is an old fort; the village will be seen just to the northward of it.

There is anchorage about midway between the Old Road Bluff and the fort in 4 or 5 fathoms water ¼ mile or more from the shore. A long ground swell, however, generally sweeps in from the southward, causing a vessel to roll heavily; and landing is sometimes difficult, as the surf breaks a considerable distance from the shore.

Cade Bay and Reef.—At 1½ miles westward of Old Road Bluff, on a projecting rocky point, will be seen a small rounded eminence, called Goat Head, 115 feet high, which is very remarkable, especially when seen from off the west end of the island. Between it and Carlisle Bay are three small sandy beaches skirted by a coral ledge. From Goat Head to the SW. end of the island, the shore is low and sandy, with swampy ground at the back; and it is still skirted by a flat coral ledge nearly dry, through which are one or two boat channels leading to good landing.

This part of the coast is also bordered with barrier reefs nearly dry in many places; and at the west end there is frequently a small sandy cay, which is occasionally heaped up or washed away by the violent action of the rollers.

This danger, named Cade Reef, lies about a mile from the shore, and runs nearly parallel to it. Its east end lies south, distant about ¾ mile from Goat Head, and extends thence to the westward 2 miles. Its outer edge is completely wall sided, and consequently very dangerous to approach during the night, as the lead will give no warning, and being under highland no estimated distance can be depended upon. In the daytime it may generally be seen, and will be avoided by keeping the governor's house on Dow Hill open of Old Road Bluff.

Middle Reef, an inner danger, is within the barrier, lying nearly ½ mile from the shore and running also parallel to it.

Anchorage.—Between it and the land there is excellent anchorage off Cade Bay, where there is a good watering place. The eastern or Goat Head Channel leading into it has not less than 25 feet water and is easy of access, but too narrow to work out of; a vessel will therefore have to run out through the western passage, which is barred by a flat, rocky ledge, on which there is not more than 21 feet of water.

Directions.—Vessels running for the anchorage in Cade Bay, or taking the inner route to St. John between the reefs and the shore, should haul close round Old Road Bluff towards Morris Old Mill, passing

Curtain Bluff, which forms the eastern side of Morris Bay, within ¼ mile. When abreast the mill, if the weather be clear overhead, discolored water will be seen off the end of the reef and the edge of the ledge which runs off Goat Head, making clear a mid-channel course.

No leading mark can be given, so that for a stranger a pilot is necessary. The best anchorage for watering is with Morris Old Mill in line with Goat Head and the large house on the Harvey Estate—which will be seen near the head of the valley under Boggy Peak—bearing N. 32° E. (N. 33° E. mag.). Round-to under easy sail, so as to take as little sweep as possible. The above berth will place a vessel about midway between the reef and the shore.

Old Fort Point.—The SW. end of Antigua terminates at Old Fort Point, which is low and rocky; there are the ruins of a fort near the extremity, and the barrack will be seen a little within them. Close on the south side of the point is Johnson Islet, a rock 18 feet above the sea, covered with brushwood; being, however, under the high land, these objects are not easily made out until on a NW. or SE. bearing.

West Coast of Antigua from Old Fort Point turns sharply to the northward for 2¾ miles to Reed Point. In this space are three small, sandy, shallow bays named Picartes, Frys, and Morris, which are separated from each other by remarkably bold bluff headlands about 100 feet in height. The high land of Antigua may be said to terminate at Morris Bay; in the vicinity, however, there are several hills which are of great value to vessels navigating the west side of the island, and are conspicuous after passing Old Fort Point. Six of them are close together on the south side of Five Island Harbor.

The Saddle, 596 feet, and Flat Top, 500 feet high, are the most eastern, and are at once distinguished by their names; Leonards, Pearns, and Mosquito Hills are conical, with peaked summits thickly wooded; the two former are nearly the same height, 450 feet, the latter much lower. Mount Thomas or Round Hill, 547 feet high, rises on the north side of Five Island Harbor, and makes as a large rounded wooded hill from all directions except the NNW., when it appears more peaked; ¾ mile to the westward of it there is a narrow table ridge of moderate elevation, terminating near its east end in a small peak, 463 feet in height, named Table Hill, which may be seen at a long distance and is a valuable landmark.

Reed Point lies at the foot of a wooded hill of moderate height, separated from the shore by a narrow neck of low, swampy land, forming the south side of Mosquite Cove, which is shallow, nearly ½ mile deep east and west, and ¼ mile wide from Reed Point to the opposite shore under Mosquito Hill. Pearns Point, at the NW. extremity of the cove, is low and rocky.

All this part of the coast is extremely dangerous to approach, as it is fronted by a coral ledge, the outward edge of which is about 2 miles to the westward of Frys Bay. The ledge is studded with rocky heads

having as little as 9 feet water on them, and ¾ mile off Frys Bay is one which is nearly awash.

There is, however, a good channel within the shoals for vessels of 14 feet draft, provided the trade wind is not too far to the northward and they have a pilot.

The Five Islands are readily distinguished when seen from the northward or southward; but from the westward, being backed by high land, they are not easily made out, except the largest, which is 50 feet above the sea. There are in fact but four islets, for the NE. part of the highest, which is called the fifth, from its appearing disconnected at a certain distance, is attached to its western end by a low rocky ledge. They are all, with the exception of the largest, low, small, rugged, rocky, and scantily clothed with brushwood. The channel, with 15 feet of water, lies between the highest and the one eastward of it.

Five Island Harbor, a bight northeastward of the Five Islands, 1½ miles deep, and, although exposed to the rollers, is a secure anchorage with the prevailing winds for vessels of 16 feet draft. The SW. point of the entrance is formed by a remarkable red cliff, about 30 feet high, ¼ mile to the northeastward of Pearns Point, separating two sandy beaches; and thence across to Pelican Point, at the northern entrance, it is nearly a mile wide. In the inner part of the harbor is a remarkable small round islet, called Maiden Island, with precipitous rocky sides, crowned with small trees, the tops of which are 90 feet above the sea.

The anchorage is obstructed by Cook Shoal, a small rocky head with 9 feet water on it in the center of the harbor, with Sandy Island in one with Pelican Point and Maiden Island N. 72° E. (N. 73° E. mag.). It is also obstructed at its entrance by the Pelican Shoal of 15 feet water, which lies with Drew Hill in one with Maiden Island, and the Shipstern Islet just shut in with Ferris Point. Pelican Islet is small, rocky, 8 feet above the sea, 400 yards westward of Pelican Point, and is foul on its east and west sides for 200 yards.

Directions.—Vessels of 16 feet draft approaching Five Island Harbor from the southward pass outside the shoals; if from the northward, within them. In the former case it will be better to beat in to the southward of the Pelican Shoal, between it and the Five Islands; a vessel may stand toward the latter without fear, as they are bold and steep-to, and toward the shoal no nearer than to bring Drew Hill a little open southward of Maiden Island, being N. 83° E. (N. 84° E. mag.) When Johnson Islet is seen through the Five Island Channel she wil be to the eastward of the shoal, and the board may be longer to th northward. When within the points of the entrance she may stand i to 300 yards from the shore, until the leading mark for the Cook Sho is nearly on. It will be better to pass to the northward of this shoa therefore in standing towards it tack when Drew Hill comes on wit Maiden Island. When within the shoal proceed as far in as conve ient, the lead being a sufficient guide.

Coming from the northward the wind will be free, and when past Ferris Point keep the shore abroad to about 400 yards, and, having rounded Pelican Islet, work into the anchorage. Leaving the harbor, run out with Seaforth Bluff shut in with the south side of Maiden Island, which leads northward of Cook and Pelican Shoals and southward of Hurst Shoals.

The Coast from Pelican Point trends NNE. 1¼ miles to Ferris Point, a wooded bluff of moderate elevation. Thence it trends to the NE., forming two sandy bays, named Galley and Goat Hill, and terminating at Goat Hill, which is remarkable, 176 feet above the sea, and crowned with a small fort with signal staff, and which, seen from the southwestward, open of Ferris Point, is well defined. Nearly 200 yards westward of Goat Hill Point there is a small flat-topped rocky islet, slightly wooded, called the Ship-stern, its west side having somewhat that appearance, being a bold perpendicular cliff about 60 feet high, with several large masses of rock lying at its base, which are very remarkable when seen from the SW. or NE.

Midway between Pelican and Ferris Points, about 300 yards from the shore, is the Hawks Bill, a small, barren, black, rocky islet, 25 feet high, steep and bold-to on its west side, which may be passed at the distance of 200 yards. Its west side being composed of soft sandstone, has been cut into by the action of the sea, forming a perpendicular cliff to nearly the top of the rock, where it overhangs, projecting out almost horizontally some feet.

St. John Harbor, at the head of which is situated the city of St. John, the capital of the island, is the chief commercial port in Antigua, from whence is finally shipped almost all the produce of the island, which is brought by droghers from the outports. The city lies on the side of a gentle acclivity, which at the upper part is about 80 feet above the sea, and contains about 10,000 inhabitants. From the offing its locality is at once pointed out by the cathedral, a large, massive, white structure, with two lofty towers, the vanes of which are 163 feet above the sea.

The harbor is secure against all winds except hurricanes, but confined and not at all convenient; vessels of 12 feet draft can not come within ¾ mile of the wharves, and those drawing over 14 feet are obliged to load in St. John Road. It is also exposed to rollers, which break over the jetties and inflict serious damage. These, however, seldom occur.

Rat Islet is small, rugged, steep, and rocky; on its summit is a large building and lofty signal staff, which are conspicuous objects; the wall surrounding the building is 137 feet above the sea. The islet is connected to the shore by a well built causeway, with a carriage road to the foot of the hill. There is a signal station on Rat Islet which signals the approach of vessels, although they are generally signaled first from the station on Goat Hill.

The NW. point of the harbor terminates in a small rocky bluff 37 feet high, on which is Fort James, and the breadth across the entrance is ½ mile. A little without the entrance a flat of sand runs along the whole front of the harbor, on which the greatest depth at low water is 15½ feet, which is near the southern shore, and the channel is not 100 yards wide.

There are three principal channels which may be used to enter the road and harbor of St. John, the Northwest, West, and Southwest or Sandy Island Channel. The West Channel is, however, but seldom used, except by vessels leaving the harbor.

The city has a public library and many other charitable societies.

The authority to call on is the governor.

The United States is represented by a consul and vice-consul.

Supplies.—Provisions of all kinds can be obtained.

Water costs 50 cents per puncheon, but is bad, and there are no facilities for watering.

Coal might be obtained in small quantities, at a high price, from some of the sugar refineries.

Hospital.—There is one, to which is united the insane asylum and the poorhouse. It has an efficient staff.

Telegraph.—The island is in telegraphic communication with the United States and Europe.

Steamers call here from the United States, Europe, and the West India islands.

Port Charges.—Pilotage is compulsory. Rates are: inward, under 6 feet, $4.80; 8 feet, $5.76; 9 feet, $7.20; 10 feet, $8.64; every foot beyond, $1.50 per foot. Tonnage dues, 18 cents per ton of cargo landed. Ballast, sand, 60 cents; stone, 96 cents per ton. Labor, 60 to 75 cents per day. Harbor fees, from 120 to 150 tons, $3.84; 150 to 200 tons, $4.80; 200 to 250 tons, $5.76; 300 tons and upward, $7.68.

Landing Place.—The best landing place is at the foot of High street, marked at night with three lights, red, green, and white, like a steamer's lights end on. There are no regulations governing the landing.

Pilots.—Vessels bound in from windward, having made the east side of Antigua, generally pass round the north end and receive their pilot, who is always on the lookout in the office near Parham. The shore, however, should not be approached within at least 3 miles, as it is everywhere foul and exceedingly dangerous to strangers.

Lights.—A fixed white light, 56 feet above the sea, and visible about 13 miles, is exhibited on Sandy Island, from a black open iron-work structure with red lantern. The light, bearing S. 21° W. (S. 22° W. mag.), clears the Diamond Bank, and N. 10° E. (N. 11° E. mag.) the Hurst and Irish Shoals.

Fort James light is a fixed red light, visible through an arc comprised between Ledwell Point and the center of Week Bay. It is elevated 48

feet above high water, and should be seen, in clear weather, from a distance of about 5 miles. This light, bearing S. 69° E. (S. 68° E. mag.), leads between Sandy Island and Warrington Bank.

Pillar Rock light is a fixed green light, obscured by Goat Hill through an arc of about 16°, also inshore of Kid Point. It is elevated 106 feet above high water, and should be visible, in clear weather, from a distance of about 10 miles. The lighthouse is a white pillar, 17 feet high.

The termination of deep water and west end of the bar is marked by the light on Pillar Rock. Vessels drawing more than 12 feet must keep this light eastward of south (S. 1° W. mag.).

Current.—The usual set is to the northward and westward, but when the trades are unusually strong there is a decided set from the northward and eastward, which banks up the water inside of the bar to some extent.

St. John Road lies immediately northward of the bar, and may be said to extend from Goat Hill to the Great Sister, a space of 2 miles, but it is obstructed in the center by the Warrington Bank and the Middle Ground.

Warrington Bank is 800 yards in length and nearly the same in breadth. It has 6 feet water on its shoalest part and is extremely dangerous to approach.

Buoy.—A square wooden bell buoy, painted red, surmounted by a cage, has been placed to mark the Warrington Bank.

The buoy lies off the south end of the shoal in 6¾ fathoms of water, with Mount Thomas on the east shoulder of Goat Hill bearing S. 8° E. (S. 7° E. mag.), and Drews Hill, over Fort James, S. 63° E. (S. 62° E. mag.).

Vessels of all sizes can pass close to the buoy on its south side. The reef lies north and NE. from the buoy.

Middle Ground is a circular bank 400 yards in diameter, with a depth of from 20 to 23 feet on it.

The mark for the cut between these banks is Table Hill in one with Fort Barrington on Goat Hill S. 16° W. (S. 17° W. mag.); but it should only be taken in a case of necessity. To the eastward of the Middle Ground there is a clear ship channel 600 yards wide.

Anchorage.—There is good anchorage both to the NE. and SE. of these banks; that to the NE. is the best and most convenient, as boats will in general fetch in to the entrance of the harbor, and it is always used by vessels completing their cargoes outside.

The Sisters.—The Great Sister is a small rocky islet lying about ¾ mile from the shore, and when seen from the NW. has the appearance of a wedge, with its thick end to the SW., which is 36 feet high, bold and steep-to within 200 yards to seaward. About ¼ mile from this islet are the Little Sisters, a small cluster of rocks only 4 or 5 feet above the sea.

Sandy Island.—The approach to St. John Harbor is also obstructed

to the westward by a shallow bank from ½ to ¾ mile in extent, on the eastern side of which is a small cay called Sandy Island, clothed with stunted trees, the tops of which are 13 feet above the sea. Weymouth Reef, a dry ledge, extends S. 66° W. (S. 67° W. mag.) 800 yards from it.

Diamond Bank, the outermost danger, ½ mile long east and west, and 600 yards broad, is a coral ledge, and although nearly awash seldom breaks; under favorable circumstances, however, the discolored water may be seen from aloft, when near it. It lies also near the west end of the dangerous coral reef which extends hence to the eastward almost continuously along the north shore of Antigua, at the distance of from one to 2 miles. The Diamond Channel between these reefs, ½ mile wide, has a depth of from 4¼ to 6 fathoms. A two masted iron steamer was wrecked on north side of this reef late in 1891, and will probably remain until she goes to pieces.

Bannister Bank, nearly midway between the Diamond and the Great Sister, is nearly ½ mile long east and west, and ¼ mile broad, with as little as 17 feet water on it. The mark for its south end is Boon Mill in line with Hodge Hill bearing S. 83° E. (S. 82° E. mag).

Diamond Channel.—Hutchinsons Old Mill, difficult to distinguish, on the south side of St. John Harbor, in line with Great Sister S. 3° E. (S. 2° E. mag.), leads through in 4½ fathoms water, and between the Bannister Bank and the eastern reef in 4 fathoms. Use this range with care. When Hodge Hill comes on with Boon Old Mill S. 83° E. (S. 82° E. mag.) keep away to pass about 400 yards westward of Great Sister; thence haul in for the anchorage. For this channel local knowledge is requisite.

Northwest Channel.—With the wind scant, and no pilot, it will be better to run westward of the Diamond Bank, hauling to the southward when Mount Thomas, a dark peak, is in line with Goat Hill S. 7° E. (S. 6° E. mag.). Keep this course, S. 7° E. (S. 6° E. mag.), till Hodge Hill is in one with Boon Old Mill S. 83° E. (S. 82° E. mag.), when haul up for the anchorage.

Sandy Island Channel.—Vessels bound to St. John from the southward should take this channel if of too great a draft for the inner passage. Approaching it, the dangerous steep-to shoals on the west side of the island must be borne in mind; the lead kept carefully going, and the ship's position assured by the change in bearing of the lighthouse and by bearings of prominent objects of Antigua, care being taken not to mistake Pearns Hill for others near it. A possible set of the current, which is uncertain, should also be guarded against.

Being about 2½ miles westward of Old Fort Point, and with Ha[illegible]s Bill open west of Five Islands, a N. 1° W. (north mag.) course may be steered, which leads ½ mile outside the shoals. Do not bring Sand Island northward of N. 10° E. (N. 11° E. mag.) until Maiden Island is in one with Pelican Rock, when being abreast Hurst Shoals you may haul into the channel, which is more than a mile wide.

Having passed to the eastward of Sandy Island there is no danger until the Warrington Bank is approached, when the directions for the Northwest Channel must be followed. If intending to anchor off the bar, or to enter the harbor, a vessel may do so by the West Channel.

Ships passing westward of Sandy Island should insure their distance from it by carefully maintained bearings of the light, and by the use of the lead.

West Channel, between Warrington Bank and Goat Hill, is ¾ mile wide, and as the wind is generally blowing out it is but seldom used in entering.

Vessels bound to the eastward will gain by taking the Diamond Channel, but they should be able to lay through.

Boon Point is the extreme northern end of the island. The shore turns abruptly to the eastward and forms a bight, which terminates about 2 miles distant at Hodge Point. This part of the shore is low, rocky, and skirted by sunken shoals, and there is only one spot, nearly ¾ mile westward of Hodge Point and named Port Royal Bay, where boats can effect a landing with safety. The hill just within this point becomes a useful object in the navigation of this extremely dangerous neighborhood.

From Hodge Point the coast takes a SE. direction for 2½ miles to Fort Byham, Judge Bay Point being intermediate. The shore is low and foul. From the fort the shore becomes deeply indented, and forms two deep bights, the southern of which is Parham Harbor.

Parham Sound is about ¾ mile in extent east and west, and ½ mile north and south. It is capable of receiving a few vessels of large draft, is well sheltered, has good holding ground, and not exposed to the rollers. The Yam Piece Shoals, which are detached coral patches, extend nearly a mile from the west end of Long Island, and shelter the anchorage from the NE.

Directions.—Parham Sound may be approached from several points between NE. and NW. through narrow openings in the Kettle Bottom Shoals. The leading marks for them are given on the chart, but they are far too dangerous for a stranger, and it is only a well experienced pilot that can make use of them.

Vessels leaving Parham Sound for St. John will find it of advantage to pass within the shoals through Boon Channel, which is quite straight and clear, and nearly ¾ mile broad in its narrowest part except at its east end, where between the NW. point of Prickly Pear Edge and Silver Rock Shoal, it is only ¼ mile across.

Long Island protects the north side of North Sound and the east side of Parham Sound. It is very irregular in shape, nearly a mile in length east and west, and ¾ mile in breadth at its west end, decreasing toward the east, where it terminates in a point. The shores are low, but on its SW. end there are some trees 40 feet high. Two hundred yards northward of the NW. point is Moor Islet, small, rocky, and 8

feet high; and ½ mile eastward is Little Bird Islet, of similar character, but only 20 feet high; both are useful objects in navigating the channels through the reefs.

Bird Island Channel.—The entrance to this channel, which leads into North Sound, is a mile northward of Great Bird Island, and the few vessels that visit the sound enter by it; but it is so exceedingly dangerous to approach, narrow, and intricate, though deep enough for any ship, that no directions can be given, and it can only be navigated by the most experienced pilots. As the wind blows continually in, the passage out of the sound must be taken through a narrow channel between Maid and Long Islands, in which there is a depth of 14 feet, but it should be buoyed beforehand.

Parham Harbor is capable of admitting vessels drawing 13 feet, but the channels to it are so narrow and intricate that the few vessels which load here receive their cargoes in the North Sound, or Roads. The town of Parham stands in the SE. corner of the bight, under a wooded hill 165 feet high, on the west side of which is the church, a conspicuous object from the offing. It was at one period the seat of government, and is still of some importance, being the place of transit for the greater part of the commerce of this end of Antigua.

The eastern side of the harbor is protected by a long, irregular, low, swampy neck of land, about ¾ mile in length, which terminates at North Sound Point in a small hill 60 feet high. From the east side of the neck numerous small islets, rocks, and reefs sweep all round to the NW., inclosing a large basin of water, completely sheltered, called the North Sound.

Great Bird Island is the most remarkable of the islets which inclose North Sound, and a valuable object to the pilots. It is of irregular form, its west side very low, but its east side is a narrow strip of black, barren rock 600 yards long, rising perpendicularly from the sea to the height of 110 feet, and may be seen from a long distance, the north end particularly, as it forms a bold headland. The NE. point of the dangerous reef and coral ledge which extends all along the north side of Antigua as far as the Diamond Bank bears from the bluff N. 12° W. (N. 11° W. mag.) 1½ miles.

Three Fathom Bank lies NE., a mile from Bird Island Reef. It is about ¾ mile in length and 600 yards in breadth, with a depth of from 3½ to 4½ fathoms, over coral and white sand, with irregular soundings around.

Four Fathom Bank, lies 1¼ miles from Three Fathom Bank. It is composed of small detached rocky heads, lying nearly in line, NW. and SE. for ¾ mile, having a depth of 4¼ and 4¾ fathoms, and on which there is generally a heavy sea. Beating to the eastward, do not pass southward of these banks before the hill at the east end of Green Island bears S. 7° E. (S. 6° E. mag.).

Guana and Belfast Bays.—Between Guana Island and Indian Town Point the shore is exceedingly irregular and forms two deep bights, Guana Bay to the north and Belfast Bay to the south. Both are well sheltered by the islets and numerous reefs to the eastward, and of sufficient depth for vessels of large draft; but the channels are far too intricate for them to navigate, particularly as the prevailing winds, which are here accompanied by a heavy, short sea, make even an approach to this part very hazardous. They are frequented by droghers, which are sometimes exposed to accidents and long delays, as they can not beat out except under favorable circumstances. There is a boat channel between the bays and North Sound, through the Narrows at the west end of Guana Island.

Nonsuch Bay.—Between Indian Town and Man-of-War Points the shore again forms a deep bight called Nonsuch Bay, which is so completely protected by reefs, nearly dry, as to be a secure harbor, with a depth of from 5 to 8 fathoms; but it is equally difficult to navigate as those just described, and quite closed against sailing vessels of large draft.

Tides.—The rise of tide at Antigua sometimes amounts to 2 feet, but is generally less, and so uncertain in its periods as to be of little use to navigation. No regular tidal stream can be detected.

The Current is equally variable in its movements, and the oldest pilots can give no certain account of either its strength or direction. During the period of the survey of these islands, between November and May, little or no current was met with between Antigua and Barbuda, although this is the period when the trade wind blows strongest. In June it has been found running strong to the westward, on the south side of Antigua, when at the same time there was little or none on the north side, and an eddy stream close inshore.

CHAPTER XIII.

THE WINDWARD ISLANDS—GUADELUPE, DOMINICA, AND MARTINIQUE.

GUADELUPE.

Guadelupe Island was discovered by Columbus during his second voyage, in 1493. It was colonized by the French in 1635, and with but slight interruption has remained ever since in their possession.

The island is separated by the River Salée into two parts, the western, or Guadelupe proper, called Basse Terre, and the eastern, called Grande Terre. The whole territory is under a governor appointed by the French Government, and with the dependencies of Marie Galante, the Saintes, Petite Terre, and Desirade, has a population of 178,000 inhabitants.

The north part of the island of St. Martin is also under the control of the government of Guadelupe.

Although only separated by a shallow arm of the sea, the eastern and western portions of the island differ very materially in appearance and in their geological character.

Basse Terre, the western portion, is of volcanic origin; the soil is clayey and the surface rugged and uneven. A chain of lofty, wooded mountains traverse this part of the island from NNW. to SSE. The most northern peak of this chain is called St. Rose; the most southern, Trou aux Chiens. Near the southern end is the Soufriére, an active volcano, and near the middle are two conical peaks called the Mamelles. The last eruption of Soufriére took plack in 1799.

On the western side of the mountains the declivities are steep, with rapid torrents rushing down to the sea, but on the eastern slope the descent is more gradual.

There are among the mountains numerous mineral springs of various descriptions.

Grande Terre, the eastern division of the island, is almost a level plain, having a limestone formation, with two ranges of small hills—one on the northern shore, 300 feet high, called the heights of Bertrand, and another, farther south and running nearly parallel with the so h- ern shore, called the hills of St. Anne. These hills are about 375 et high and are separated by deep gorges, having at the bottom s g- gish and sometimes stagnant streams, which gradually filter into he sea through the sand bars at their mouths.

The principal productions of the island are sugar and manioc, bu ll kinds of tropical fruits and vegetables are raised, and large quant es

of sugar, coffee, cocoa, rum, molasses, annato, cotton, dyewoods, etc., are exported. The importations consist principally of rice, salt, fish, wines, machinery, hardware, cotton, silk, and worsted goods.

Port Charges.—By a law taking effect January 1, 1888, vessels of all nationalities are exempted from all port charges; this law applies to all the ports in the island of Guadelupe.

Pilots.—Pilotage is compulsory to vessels over 60 tons. Rates as follows: 15 to 30 tons, $2; 30 to 60 tons, $6; 60 to 80 tons, $12; 80 to 100 tons, $15; 100 to 150 tons, $22.75; 150 to 200 tons, $27.85; 200 to 250 tons, $33; 250 to 300 tons, $38; 300 to 350 tons, $43; 350 to 500 tons, $48; above 500 tons, 10 cents per ton.

Water Tax.—To be paid at Pointe à Pitre only. Five cents per ton register whether taken or not.

Interpreter's Fees.—One dollar for 60 tons and under; $6, 60 to 100 tons; $7, 101 to 150 tons; $9, 151 to 200 tons; $12, 201 to 250 tons; $16, 251 to 300 tons; $21, 301 to 350 tons, and $27 above 350 tons.

Mails.—Guadelupe has mail communication with the other West India islands and with Europe at least four times a month, while almost daily communication takes place between the different towns of the island and its dependencies. The mails with America are irregular.

Telegraph.—By means of the telegraph cable landed at Basse Terre and joined to numerous land lines, the ports of the island are in constant communication with the United States and Europe.

Climate.—Except during the rainy season, the climate of Guadelupe varies slightly as regards either barometric pressure, temperature, or winds. The barometer rises regularly every day till about 9.30 a. m., then falling till 4.30 p. m., rises again till 10 o'clock in the evening, when it again falls till 4.30 a. m., oscillating during each twenty-four hours between 29.99 inches and 30.07 inches. The mean daily height also varies during the year, being lowest in October, increasing till March or April, then remaining nearly stationary till July, when the maximum height is attained, after which the mean daily pressure gradually decreases during the rainy season. The abnormal variations of the barometer are almost always accompanied by hurricanes, which take place during the rainy season, between July and November. When observed at other times of the year they indicate atmospheric disturbances taking place at a distance too great to be otherwise felt in this island.

Temperature.—The mean temperature of Guadeloupe is about 79° Fahrenheit throughout the island, except at Basse Terre, where it is 80°. Its minimum is reached between January and March, ranging from 70° early in the morning to 84° at noon, while during the rainy season the least temperature is about 70°, rising in the middle of the day to 88°, sometimes, but very rarely, attaining a height of 95°.

Rain.—The average amount of moisture in the air of Guadeloupe is very great. If complete saturation to the point of precipitation be con-

sidered as unity, the usual amount of moisture may be represented as from 0.64 to 0.73.

Heavy rains are most frequent from the middle of July to the middle of October, being then attended by violent thunder squalls.

Showers fall occasionally at all times of the year, but are less frequent on the weather side of the island than to leeward.

At Pointe à Pitre the annual rainfall is nearly 40 inches; at Basse Terre nearly 60.

Winds.—The winds blow almost constantly from the eastward. The following table shows the mean observations for three years:

	Direction of the wind.										
	North.	NNE.	NE.	ENE.	East.	ESE.	SE.	SSE.	South.	Calm.	Light westerly airs.
Number of days during the year.	8½	5½	68½	40	136½	26½	40½	3	2½	30½	5

During the months of December, January, February, and March the wind has the most northing, somewhat heavy but short squalls from north and NE., attended with copious showers, being not infrequent about the end of the year.

In February the wind blows freshly from the east during the day, with fine weather, the breeze decreasing every evening and rising again about 8 or 9 o'clock in the morning.

In May the winds become comparatively regular between ESE. and SE., continuing until November, when they gradually draw round to the northward. The commencement of the rainy season, about the end of May or beginning of June, is marked by thick weather, with a heavy swell along the coasts. Generally, however, with the exception of squalls and occasional hurricanes, calms and light, variable winds prevail during the rainy season. Calms also occur sometimes during March and April. The summit of the Soufriere Mountain is generally visible shortly after sunrise for a quarter or a half an hour, when it becomes hidden. If during the day it is again uncovered it is an indication of calms and fine weather.

When the breeze is fresh on the weather side of the island it also blows strongly to leeward, but when it is light to windward it is very apt to be calm on the lee side of the island, or else a light westerly wind is experienced, modifying very agreeably the excessive heat frequently felt.

Rollers.—At Basse Terre rollers are experienced during the ra season, while at Port du Moule they are only felt toward the end of year.

Earthquakes are frequent at Gaudeloupe. The most violent on rec was in February, 1843, when the town of Pointe à Pitre was destroy

Chateaux Point, the eastern extreme of Guadeloupe, is a bluff, roc point, of quite remarkable appearance, having off its northern side tw

sharp-peaked, rocky islets. The point is clear of danger and may be passed close-to.

Port St. François, about 6 miles westward of Chateaux Point, is only a reef harbor, about 200 yards in diameter and with a depth of 13 feet. With a SE. wind a heavy sea sets in here.

There are two sugar factories in the neighborhood, but no stores can be procured, and vessels must be entered and cleared at the custom-house of Pointe à Pitre.

The position of the harbor may be known by the houses of the town, partly in ruins.

During the season of NE. winds vessels may anchor to the southward of Port St. François, ½ mile off shore, in 6 fathoms of water, with a bottom of sand and broken shells.

St. Anne Anchorage, 7 miles farther west, is fit for vessels drawing not more than 13 feet. The harbor, though small, is well sheltered and not difficult to enter. The best channel, called the Grande Pass, is on the eastern side of the reefs which protect the mouth of the harbor. At the western end of the village is the jail, having a squar tower in the middle, surmounted by a pointed roof, and inland a little way are the gray ruins of the Plaisance Mill, which must not be confounded with another ruined mill close to the beach.

Buoy.—A red buoy is moored off the entrance to Grande Passe westward of the 5-fathom patch, with the east side of the jail bearing N. 31° W. (N. 30° W. mag.).

Directions.—Vessels approaching St. Anne, intending to make the anchorage, should bring Grande Passe buoy in line with the east side of the jail and hold this alignment N. 31° W. (N. 30° W. mag.) through the pass to the anchorage.

At the anchorage the holding ground is very bad; with the wind from SE. a heavy sea sets in. Several vessels on getting under weigh have gone ashore on the reef to leeward.

Le Diamant.—At about 3 miles westward of St. Anne and ½ mile off shore is the Diamant Rock, a little above water. West of it is Sable Islet, small and covered with sand, except the north point, which is wooded.

Petit Havre.—Between the shore and the coral bank on which are the above islets is an indifferent anchorage in 3½ fathoms, with Simonet Mill N. 1° W (north mag.) and Petit Havre Point N. 78° E. (N. 79° E. mag.).

Gozier Islet, 3 miles westward of Sable Islet, is circular, very low, sandy, and about ¼ mile in diameter; it lies about ½ mile off the town of the same name, and in the channel between there are from 10 to 16 feet water; it is fringed with a coral reef. A berth of ¾ mile should be given this islet. At Gozier commences the outer line of shoals and cays, which extend about 6 miles in a SW. direction to Goyave Point.

Light.—On Gozier Islet is a tower built of masonry, from which is exhibited a fixed white light visible 12 miles.

Pilots.—Pilots for Pointe à Pitre and all the neighoring ports are stationed on Gozier Islet. They do not go out at night.

The Bay of Pointe à Pitre, or Petit Cul de Sac Marin, is of some extent, with numerous islets, cays, and dangerous banks. The largest and most conspicuous of these islets are Cochons, l'Anglais, Frégate de Haut, and Frégate de Bas, but it is often difficult to distinguish them from the land. The outer edge of the banks named Mouchoir Carré, Mouton Vert, and Caye à Dupont is about 1½ miles SE. of the islets; these banks are on the west side of the channel leading to Grande Bay, and the Saintes kept open of Guadeloupe clears them to the eastward. For a large ship a pilot is most necessary.

Two and a half miles S. 67° W. (S. 68° W. mag.) of Gozier Islet is the Mouchoir Carré; it is of small extent, with about 12 feet water on it, and generally breaks. A bell buoy surmounted by a mirror is moored northeastward of Mouchoir Carré. West of this about ½ mile is Caye Plate, a coral patch with 18 feet water on it. About a mile S. 22° W. (S. 23° W. mag.) of Mouchoir Carré is Mouton Vert, on which there are 16 feet water; it extends ½ mile to the NW., and there is at that end a patch with 12 feet water on it; although the sea rolls heavily over this bank, it does not break, and is therefore not so easily distinguished. Three-quarters of a mile to the southward of this is the Caye à Dupont, ½ mile in extent and with two patches awash. Nearly mid-channel between these two latter shoals is a coral head, with 18 feet water on it. About ½ mile to the southward of Caye à Dupont is the northern edge of the Caye Martinique, and which extends to Goyave Point. The channels, however, between the shoals and islets within them are navigable for small vessels bound to Petit Bourg, Goyave, and St. Marie.

Grande Bay is a slight indentation in the land just outside the entrance to Pointe à Pitre. The western limit of the bay is a bold headland, on which is a fortification called Fleur d'Epée. There is good temporary anchorage here in 4½ fathoms, with the fort N. 33° E. (N. 34° E. mag.) and Gozier lighthouse S. 74° E. (S. 73° E. mag.). Vessels loading in any of the neighboring sugar ports anchor here while effecting their clearance at the customhouse of Pointe à Pitre.

Bacchus Point, one of the most important landmarks in approaching Pointe à Pitre, lies on the western side of the bay. It is a triangular bluff surmounted by two hillocks, and is marked by horizontal shelves all along the face of the bluff.

Cochons Island is in the northern part of the bay, and forms the western side of the channel leading to Pointe à Pitre. It is easily distinguished by the fort and flagstaff on its eastern end. It is low and wooded, steep-to on the southern side, and on the eastern side has coral reef awash at low water, and running off 300 yards.

Pointe à Pitre Harbor, near the entrance of the River Salée, approached through a somewhat crooked channel. It is formed

Cochons Island and the neighboring islands on the west, and by the cays and reefs extending from the shore on the east.

The beacons on the west side of the harbor mark shoals of small extent having passages between them.

A spit extends westward from off the northern wharf, having at its extreme a bank of 6 feet.

The town of Pointe à Pitre, on the NE. side of the harbor, is one of the most important commercial places in the Windward Islands. It is a clean, well-kept, thriving place, of 18,000 inhabitants. It was settled in 1763, and was in 1843 destroyed by an earthquake.

The harbor is perfectly secure, even in hurricanes. On the eastern side is an extensive sugar factory called the Usine d'Arbousier.

The United States is represented by a consul and vice-consul.

Authorities to visit: The mayor and captain of the port.

Water can be obtained by sending ships' boats to the pipe at the wharf.

Provisions of all kinds can be obtained at reasonable rates.

Coal.—There is a very small quantity to be bought; cost from $6 to $7 per ton. The sugar factories import from 30,000 to 40,000 tons a year, but it is for their own use only.

Hospitals.—There is one military hospital, in charge of a naval surgeon; capacity of about 120 patients, and is kept very clean. Sailors from foreign vessels are admitted for about $1 per day.

There is also a civil hospital; capacity, about 200 patients; charge, 35 cents. The sanitary condition is very good, the city being clean. Malaria and dysentery are common.

Telegraph.—A land line connects the city with Basse Terre, and from there is a cable connecting the island with the United States and Europe.

Steamers.—The French Line and Royal Mail Line steamers call at this place.

Repairs can be made here to small vessels, but no extensive repairs can be made.

Beacons.—The beacon on Rose Bank is painted white, surmounted by a black disk; and the beacon on Couillons Bank is black, surmounted on a black disk.

Provençal Bank is marked by two beacons similar to the last mentioned.

Dredging operations are in progress to deepen the several shoals in the harbor to a depth of 4½ fathoms.

A mooring buoy is laid down for the mail steamers.

Harbor Lights.—A white light on buoy off Cochons Island, to be left to westward; a red and green light on buoy SW. of Caye d'Argent; a green light on buoy off Rat Island, and a green light on buoy off Manroux Island, to be left to the eastward; a fixed light, visible 7 miles from a mast on Manroux Island. An iron beacon, painted red and surrounded by a cage, is situated on Fouillole Point, close to the water's

edge. A sector of red light over an arc of 13° is exhibited from the beacon at an elevation of 77 feet above the sea, and is visible in clear weather from a distance of 6 miles. These last two lights in line leads eastward of Mouchoir Carré.

Tides.—It is high water, full and change, at Pointe à Pitre at 10h. 0m.; springs rise 1¼ feet.

Directions.—Vessels approaching Guadeloupe from windward should endeavor to make the island of Desirade, keeping on the parallel of 16° 20′. On making this island, which can be seen at a distance of 30 miles, the course lies between Chateaux Point and Petite Terre, and then along the coast of Grande Terre, keeping at least one mile off shore on account of the 17-foot bank. When abreast of Gozier Island, haul to the northward to take a pilot if intending to go inside.

With a vessel drawing 20 feet or more, and being to the SW. of Gozier Island, bring Jarry Mill, now in ruins and not easily picked up, the west side of the harbor, to bear N. 46° W. (N. 45° W. mag.). It will then be just open to the eastward of the east point of Cochons Island, and open to the southward of the only outer buoy; this line will lead up to the outer anchorage or to the entrance buoy.

Vessels coming from the west and south will usually have to tack before they can fetch the entrance. In approaching the entrance of Point à Pitre, they should not stand so far to the westward as to shut in the Saintes Islands with Capesterre Point.

On nearing the entrance by keeping to windward of a line drawn from the Usine d'Arbousier through Manroux Island lighthouse, S. 12° E. (S. 11° E. mag.), the outer shoals will be avoided.

If Desirade Island should be made during the night, the navigator should keep in sight the light on Petite Terre, visible 15 miles in clear weather, and guided by it there will be no difficulty in coasting along the south side of Grande Terre, keeping in from 11 to 14 fathoms of water until Gozier Island light is made. Care should be taken to keep clear of the coral reefs on the west side of the bay by keeping this light bearing to the northward of N. 44° E. (N. 45° E. mag.) till daylight. Although the buoys are lighted, strangers should not attempt to enter at night.

Vessels generally go to sea with the land breeze at early daylight, usually taking a tow boat at the cost of 10 cents a ton.

Bound to the United States or Europe they generally pass to leeward of Guadeloupe. Some navigators prefer to go to windward of Grande Terre, beating through the channel north of Marie Galante and passi between Chateaux Point and the island of Desirade.

Petit Bourg is frequented by small vessels and may be reach after passing within the line of outer shoals, by passing close to t southward of Fregate de Haut Island and of Hache Island, and ke ing on the same course ½ mile farther, when good anchorage in 20 f will be found 300 yards off shore.

Goyave Anchorage.—Local knowledge is necessary to take a ship in and out.

St. Marie is an important port of export for sugar. Its locality is easily distinguished by three red bluffs just north of the town.

It is an excellent anchorage for vessels not drawing over 15 feet, but the approaches are intricate, and the assistance of a pilot is necessary.

Lights.—A fixed white light on the shore, about 153 yards eastward from the site of the old house with a red roof. The house no longer exists.

A fixed white light on piles at northern extremity of the one-fathom shoal, west side of Le Gros Loup.

A fixed red light from a buoy moored on the NW. edge of Le Gros Loup.

There are two jetties or piers at Port St. Marie; one, about 153 yards west from the harbor light, is a landing constructed and maintained by the colony; the harbor light is at the inner end of the other, which has been completely abandoned.

There are three beacons not lighted in the harbor; one at the SE. extremity of Les Peignes, one at the NE. point of the Caye à Sauté, and one at the SE. extremity of Caye Bateau.

The District of Capesterre, lying south of St. Marie, was formerly the richest and most highly cultivated part of Guadeloupe. Rising high above it is Madelaine Mountain, with numerous torrents rushing down its abrupt slopes.

Off Capesterre Point the soundings are very irregular, and a berth of one mile at least should be given to the coast.

Coast.—The coast from Capesterre Point to Vieux Fort Point forms a series of points and open exposed bays into which droghers come for sugar.

Vieux Fort Point, the SW. point of Guadeloupe, is formed of blackish rocks with a large rock close off of it.

Basse Terre.—The anchorage is a perfectly open roadstead, with very deep water at a short distance from shore. With the wind from south or west the anchorage is very unsafe, and vessels should at once go to sea, but during the season of strong trades, although a somewhat heavy swell almost always sets in, the anchorage is safe. Even during this season heavy rollers sometimes cut off all communications with the shore for a time.

Vessels approaching the anchorage from the southward should haul close round the south point of the island, keeping always prepared for the violent puffs of wind which rush down from the mountain, and, keeping the shore close aboard, should haul up for the anchorage inside the mooring buoy of the steamers, and anchor off the town, as most convenient, in from 16 to 22 fathoms, 300 to 400 yards from the shore.

The town of Basse Terre is the seat of government of the island, and has a population of about 9,000.

There is a fine hospital for foreigners at the foot of Camp Jacob.

Telegraph.—There is frequent mail communication with other islands, and the West India and Panama Telegraph Company have an office here.

Water can be easily obtained from a pipe emptying near the center of the town. Fresh provisions may be obtained.

Lights.—A red harbor light, visible 7 miles, is exhibited from the quay, and a similar one, but of less elevation, at the end of the wharf.

Signal.—Signals are made from the mast at the port office.

West Coast of Guadeloupe.—Between Basse Terre and Grande Anse, 20 miles to the NNW., there are many small bays affording anchorage for small vessels. The principal are named Du Plessis, Barque, and Bouillante; the latter is 9 miles from Basse Terre, and receives its name from the two hot springs in the neighborhood. At 1½ miles farther on is Criquet Bay, sheltered on the west by Goyave or Pigeon Island, leaving between it and the shore a channel called the Passe des Vaisseaux. Beyond this are those of Caillou, with the town of the same name or Point Noire, where landing will be found to the south of the village on a beach of gray sand. Ferry, Deshayes, and lastly Grande Anse, which is separated from the last named by the lofty promontory of Gros Morne.

From Gros Morne the coast trends to the NE. for 5 miles.

Grand Sec is a bank which commences off Point Ferry between ½ and ¾ mile from the shore and extends northward to within ¾ mile of Kahouanne Island. Off Point Breton, on this bank, there is a depth of a little over 30 feet of water.

La Perle Shoal, on which are 6 feet water, is about ⅛ mile west of the point of same name and a little more than a mile S. 19° W. (S. 20° W. mag.) from the south point of Kahouanne Island. The bank runs to the northward for ½ mile and is parallel with the shore. Between the bank and shore there are 30 feet of water, but this passage should not be attempted.

Tête a l'Anglais, a small gray islet skirted by reefs, lies about 1½ miles off the NW. point of Guadeloupe; thence the coast turns suddenly eastward, continues very high, and should be navigated with extreme caution.

Lights.—A fixed red light is exhibited at an elevation of 69 feet from the north point of entrance to Barque Cove, visible 9 miles. A fixed white light is also shown from a mast 20 feet high, in the inner part of the cove.

Winds and Currents.—On the western coast of Guadeloupe the is a land breeze almost every night, extending about 2 miles off shor and exceedingly useful to vessels bound either north or south.

Outside of this limit light variable breezes and calms, lasting sever days, are sometimes experienced, so that vessels which do not approac the land close enough to benefit from the land breeze would do well keep 20 or 25 miles off shore to avoid these calms.

Currents.—A strong SE. current, depending on the strength of the NE. trade wind, is frequently felt off the west coast of Guadeloupe. Tides are very little felt.

North Coast of Guadeloupe.—About 1½ miles northward of Vieux Fort Point lies Kahouanne Island, at the west end of a reef which extends along the shore, increasing its distance off to 3 miles, to within about 2 miles of the west side of Grande Terre. On this reef are several small cays, which serve to warn a vessel of her approach to the reef when beating to windward; and within it there is a good channel for small vessels. There are also several cuts through it, navigable for vessels bound to the small bays of Rose, Lamentin, and Mahaut.

The best of these passes are Grande Coulée, between the reefs which extend from the east side of Anglais Islet and the west side of Blanc Isle, in which there is a depth of 6 fathoms; Passe à Caret, west of the islet of that name, has a depth of 4½ fathoms; and Passe à Colas, the most eastern, is of greater depth, but neither of them can be navigated safely without the assistance of a pilot, though the water is so clear that the shoals can generally be seen from a short way aloft. In working up the channel within, it will be advisable to border towards the reef, particularly after passing to the eastward of Rose Bay, when the shore becomes skirted by reefs and cays.

The Pilots who are familiar with the intricate channels of Cul de Sac Marin are almost all fishermen, and, like those of the Bahama Bank, endeavor in navigating these channels to have the sun behind them, and are guided to great degree by the color of the water in avoiding dangerous shoals.

Grand Cul de Sac Marin is the large bay between the Points Allegré and Grisgris. The whole bay is bordered by the reef previously mentioned, extending from one to 3 miles off shore, and is studded with islets and shoals. The sea is smooth, but the bay can not be navigated without a pilot.

Rose Bay is sheltered on the north by a reef, through which are two small openings, with a depth of from 15 to 22 feet; the western opening leads to the small bay of Ramée; the Grande Coulée Passe lies north of it. On this part of the shore a long, low, narrow, level plain lies at the foot of the great mountain range.

Lamentin Bay.—Nègre Point, the extremity of a narrow ridge of land, separates Mahaut Bay from that to the west, named Cercelle; and west of the latter is the bay of Lamentin, with the town of the same name. These bays are obstructed by sand banks, and only navigable for very small vessels.

A small river of the same name runs into the sea at the head of the bay, and Grande River, the principal stream of Guadeloupe, which rises in the central mountains, empties itself near the north point of the bay.

Mahaut Bay is about 6 miles eastward of Rose Bay, on the north side of the narrow tongue of land which separates Grande Terre from

Capesterre. There is excellent anchorage in the outer part in 7 or 8 fathoms water, and farther in off the town in from 3¼ to 4½ fathoms. The best pass to enter is the Caret.

To the eastward of Mahaut Bay, and SE. of the little islet of Christophe, is the north entrance to Salée River, which separates Capesterre from Grande Terre.

Petit Canal Bay, on the west side of Grande Terre, extends from Macou Point, off which is Macou Island, which lies 4 miles northward of the entrance to the River Salée, to Grisgris Point, 3 miles to the northward of it; it is, however, only an anchorage for droghers, who find their way by the eye, through the reefs fronting it to the westward.

Port Louis is an open roadstead. The anchorage is tolerably well sheltered from June to October, although a NNW. swell is felt; at other times, however, it is quite exposed.

It is easily recognized by the high chimney of the usine, or sugar factory, one mile east of the town.

The population is about 4,100. Provisions are scarce and dear and rain water only can be obtained. Vessels come here to load sugar, but must enter and clear at the customhouse at Pointe à Pitre.

Anchorage.—The best anchorage will be found directly abreast of the town in 8 fathoms of water, about ¼ mile off shore.

This part of the coast is foul to the distance of nearly ¼ mile, and the bank of soundings only extends about ⅔ mile off shore. Five feet of water will be found at the end of the wharf.

Light.—A fixed white light is shown from a mast on the beach at an elevation of 39 feet and is visible from 4 to 5 miles.

Grande Vigie, or North Point, is quite remarkable, being formed by a sharp rocky point, something like a ship's cutwater, and surmounted by a flat table-land. From Grand Vigie as far as St. Marguerite Bay the east coast of Guadeloupe is bold and clear, with rocky cliffs about 200 feet high.

St. Marguerite Bay is an open roadstead, without any protection from the trade wind, and consequently not safe. From this bay the shore again becomes foul to the distance of from one to 400 yards as far as Chateaux Point.

Port du Moule, nearly midway between North and Chateaux Points, is exposed to the trade winds and is only protected by a reef which is partially under water. The harbor is bad and the entrance to the same is less than 200 yards wide, with a rough and rock bottom. Vessels often strike on the bar and wrecks are of freque occurrence. There is often a heavy swell on the bar which m detain vessels from entering or leaving. Vessels lying in port a obliged to moor head and stern, one anchor to the reef and the otl cable to the shore. Even in the smoothest time there is quite a sw and, when there is any wind, vessels roll badly. The city is about miles from Pointe à Pitre with which it is connected by a mac

amized government road. A mail post and a diligence ply between the places and there is telegraphic communication.

It is the second town in size of Grande Terre and has a population of about 10,000.

Signals are made to approaching vessels from the office of the captain of the port and are as follows:

A square red flag at the masthead indicates that it is impossible to enter the harbor and to keep well in the offing; the same flag at half mast, that the entrance is not practicable, but may become so at a moment's notice and to keep as near the harbor as possible with safety.

The pilot flag, blue with white center, denotes that the pilot has left the shore; the flag remains hoisted until the harbormaster makes signal for entering by hauling down the pilot flag and hoisting a white and blue diamond flag.

When the pilot is on board and the red flag is hoisted at masthead, it recalls him on shore and the vessel should keep well in the offing until next warning.

Vessels should not go to the westward of the port, as there is always a current in towards the shore and it is usually calm from five to six in the evening.

Light.—A fixed white light is shown from a mast 47 feet high and should be visible 7 miles, between WSW. and SE. through south. It serves as a guide to the entrance, and vessels at night should bring it to bear S. 22° W. (S. 23° W. mag.) and keep on that bearing under short sail so as to be ready to receive a pilot at daylight.

Pilots.—The harbor can only be entered with the aid of a pilot, who is ready to board vessels when the bar is passable.

La Couronne Rock, 1½ miles eastward of Port du Moule, is an excellent landmark.

Gourde Islet.—From Port du Moule to Chateaux Point there is no safe anchorage. About 4½ miles NW. of the latter is Gourde Islet, which is rather remarkable and lies just outside the reef, which is steep-to.

Rollers, which are frequent from October to May among the Virgin Islands and the groups NW. of Guadeloupe, sometimes extend to this Island, and as they set in from the SW., vessels should be prepared during these months.

DESIRADE.

Desirade Island lies about 5 miles eastward of Guadeloupe, of which is a dependency, is 6 miles long, from one mile to 1¼ wide, and about 0 feet high. The population is about 1,600. The climate is very dry, tle rain falling. Cotton is cultivated.

The eastern point of the island should be given a good berth on account of the Mouton Rock, lying 600 yards off it and generally breaking.

The channel between Desirade and Chateaux Point is frequently used by vessels bound to the northward. The Desirade Shore should be kept aboard.

Currents.—After strong easterly winds there is a westerly current of 2 knots and upwards off Colibris Point.

Water is only to be obtained from a deep ravine on the NE. side of the island.

Grande Anse is the principal town of Desirade. Small vessels can pass through a cut in the reef and find sheltered anchorage inside, and in fine weather larger vessels may anchor outside in 5 fathoms of water with the church bearing north (N. 1° E. mag.); but the soundings are irregular.

Mahault Bay, near the eastern end of the island, is a similar small reef harbor for coasters. The government has established here a leper hospital.

Galet Anchorage.—There is good anchorage under the SW. end of the island, in 5 fathoms water, with the two rocks off Point Colibris in line, and a remarkable tree in one with a house on the beach near the middle of the bay, but this anchorage is mostly visited by a double swell, rendering communication difficult; a better anchorage is off Grande Anse, as above, but only in fine weather, and on no account under 5 fathoms, as under this depth coral heads prevail.

Soundings.—From about the meridian of the center of Desirade, the soundings of more than 90 fathoms on the edge of the bank decrease rapidly westward, and about midway between Desirade and Petite Terre there are only 10 and 12 fathoms water. The water is here much discolored, showing in light and dark patches for a considerable distance, and the bottom distinctly seen. The depth between Desirade and Petite Terre varies from 9 to 15 fathoms; about midway between Chateaux Point and the SW. end of Desirade the depth is upwards of 188 fathoms.

PETITE TERRE.

Petite Terre is the name given to the low, sandy islets separated by a narrow cut and lying SE. from Chateaux Point. The northeastern islet is called Terre d'en Haut; the southwestern one Terre d'en Bas. They are mostly covered with vegetation and have a narrow sand beach along the water's edge. The inhabitants are mostly fishermen. All its shores are foul and rocky, to the distance of from ¼ to ½ mile; there is a rock named Baleine du Sud (South Whale) S. 19° W. (S. 20° W. mag.) about ½ mile from the lighthouse; also a shoal pa of 4¾ fathoms nearly a mile south from the west end of the isla shoal water also extends nearly a mile westward of the west end.

When coming from the eastward, a depth of from 13 to 20 fath will be found at 2 miles north and south of the island, and it sho not be approached within this distance.

Light.—A lighthouse stands 202 yards from the east end of Petite Terre Island and exhibits 108 feet above the sea a fixed white light, visible 15 miles.

Bank.—Sans Nom (Vaisseaux Banks), about 9 miles westward of Petite Terre and southward of Port St. François, Guadeloupe, is a bank with as little as 6 fathoms of water on it, and there is also said to be a 7-fathom bank about 7 miles to the NW. of Marie Galante, but this is very doubtful.

MARIE GALANTE.

Marie Galante Island, under the government of Guadeloupe, lies 13 miles eastward of the Saintes, in the channel between Dominica and Guadeloupe, 16 miles NNE. of the former and 15 miles southward of the east end of the latter. The area of the island is about 60 square miles, and its population about 15,000. Its shape is nearly oval, being 10 miles long north and south and about 8 miles east and west. It is of moderate elevation and rises gradually from the south towards its NE. end, its general appearance being flat and low. The southern and eastern shores are dangerous, being skirted by a reef to the distance of from 2 to 3 miles. The west side is comparatively clear and affords anchorage off almost all parts; the soundings generally are regular and gradually diminish towards the shore, but there are patches and attention to the lead is required.

Grand Bourg, at the SW. extremity of the island, is the principal town and has a population of about 6,500. The harbor is formed by low cays, only uncovered at low water, and is very small, with a depth of from 10 to 15 feet. The channel between the cays leading to it has 16 feet of water and is 600 feet wide. Large vessels anchor outside the reef in about 8 fathoms of water, with the church tower in line with the end of the breakers, bearing N. 44° E. (N. 45° E. mag.). The bank of soundings is quite narrow, and ¾ mile outside of the reef there are 28 fathoms of water.

Light.—A fixed white light is shown from a mast, 46 feet above the sea, which may be seen in clear weather above 7 miles.

The light mast in line with the church leads between the Mayeux Shoal and the NW. point of the great reef. This mark also points out the best anchorage in the outer roads in not less than 8½ fathoms, as closer in a vessel rolls very much, but the anchorage of St. Louis should be preferred, where fresh provisions can be procured.

St. Louis Bay is the best anchorage for large vessels. The holding ound is good and there is anchorage ½ mile off the village, in 4 fath- ns of water. The bay is full of excellent fish, and by hauling a seine rge quantities may be easily taken.

Vieux Fort is a small village of little importance. Abreast of it is small islet of the same name, with a 15-foot channel between the islet d the mainland.

Directions.—Coming from the northward give Vieux Fort Islet and Cimetière Point a berth of a mile, and after passing the latter a vessel may haul in for the anchorage at St. Louis. From Folle Point to the southward the coast should not be approached within a mile, and, as before observed, the south end of the island is very dangerous, and should not be rounded within the distance of 3 miles.

Anchorage in 5 fathoms of water will be found ½ mile off shore, with Vieux Fort Islet bearing N. 44° E. (N. 45° E. mag.) at the same distance.

A Shoal, with from 3 to 5 fathoms of water, extends ½ mile northward of this islet, with a 5-fathom patch lying ¾ mile from the islet N. 12° W. (N. 11° W. mag).

Capesterre on the southeastern side of the island has a small reef-harbor, where coasters load the sugar brought from the plantations of the east and NE. parts of the island.

LES SAINTES.

Les Saintes, so called from their having been discovered on All Saints' Day, form a group of islands attached to the Government of Guadeloupe, and lie in the channel between Guadeloupe and Dominica, from both of which they are separated by clear and deep channels.

Terre d'en Haut, or St. Peter, the largest and easternmost of the group, is separated from Terre d'en Bas, or St. Paul, the westernmost, by a channel ½ mile wide, navigable for vessels of any size. There is but little vegetation on the island. The inhabitants are skillful fishermen and boatmen.

The climate of these islands is exceedingly healthy; fevers are said never to occur.

Water is scarce, people generally depending on rain water and the fall of rain being less than in the neighboring island. Fresh provisions can generally be obtained.

Terre d'en Haut (St. Peter) is of a very irregular shape. Mount Chameau, at the SW. end, has a tower on it, the summit of which is 1,036 feet above the sea. On one of the northern hills is Fort Napoleon, used as a military prison, and the NW. end of the island ends in a steep promonotory called the Sugarloaf.

The town and principal anchorage are on the west side of the island, in a bay abreast of Cabrit Islet.

The shore of Terre d'en Haut is generally clear of danger; there is, however, 100 yards N. 33° E. (N. 34° E. mag.) from Point Portail (at foot of the hill surmounted by Fort Napoleon), a rock (le Caille) with feet of water on it, which breaks when the sea is at all rough. All r Terre d'en Haut are small bays and coves, in most of which landi- practicable.

There is temporary anchorage in 10 fathoms of water between Bo Point and Redonde Islet, off the southern point of the island; bu

best anchorage is off the town, a good harbor, with a depth of from 9 to 14 fathoms, and well sheltered to the westward by Cabrit Island.

For vessels not wishing to enter this harbor, good anchorage may be found between the Sugarloaf and the SW. side of Cabrit Islet, in 11 fathoms of water, with a bottom of sand and coral.

Cabrit or St. George Islet serves as a quarantine station. There is also a penitentiary on it. Vessels in quarantine anchor here, abreast of the cove, with the south point of the islet bearing about S. 68° E. (S. 67° E. mag.) in 11 fathoms of water, with a bottom of sand and shells.

The Northern Channel (Baleine Pass or Whale Passage), between Terre d'en Haut and Cabrit, is about 400 yards wide, with a depth of from 10 to 18 fathoms. Nearly in the center of the entrance is Whale Shoal, a rocky patch, on which there are only 2 feet water. It is steep-to and lies 700 yards S. 78° W. (S. 79° W. mag.) of Portail Point, the NW. end of the island. Whale Rock, or la Baleine, has 8 or 10 feet above water and lies somewhat more than 200 yards from the NW. shore of Terre d'en Haut.

Should the shoal not break, the water is so clear that it may readily be seen from aloft. The channel westward of the Whale Shoal is called the Whale Passage, and that eastward, or between Whale Shoal and the rock of the same name, the Passage des Vaisseaux.

Sugarloaf Passage lies between the southern point of Cabrit Island and Red Head, both of which points are steep-to and clear of danger; but the channel is obstructed by a coral shoal 100 yards in diameter, on which there are only 7 feet of water. A white buoy is moored on the SE. extremity of this shoal. The water does not generally break on this shoal, but the discolored water indicates its position. Sugarloaf Passage is convenient for leaving Bourg Anchorage.

Directions.—Vessels bound into the harbor of Terre d'en Haut by the northern channel may enter by either the west or east passage. The former is the best, except with the wind to the southward of east, when the latter may be taken with advantage.

By the west passage, which is nearly 400 yards wide, having passed the north end of the island at the distance of about ½ mile, steer to the westward until the white chapel (to the southward of the church), a very conspicuous object, is in line with a beacon with a black triangle on it (the beacon is on top of a hill; the old church is difficult to make out), which leads westward of the Whale Shoal. A vessel may then haul up for the passage and anchor as convenient off the town, about 300 yards from the shore, with the Whale Rock just open of the land.

By the eastern passage steer as above directed until Boisjoli Bluff is on between the Sugarloaf and Sandy Point, S. 41° W. (S. 42° W. mag.) This mark clears le Caille Rock and leads through the passage between the Whale Rock and shoal. When the church in the town opens out, haul up for the anchorage.

The anchorage here is good, safe, spacious, and very healthy. Vessels resort here when driven from Guadeloupe or Fort de France by sickness. The climate is said to be particularly favorable for the cure of dysentery. There is a small hospital, to which convalescents from Guadeloupe are often sent, besides sick from the ships and garrison. Excellent grapes are grown, but other fruits or supplies are very limited; the little creeks pertaining to the group are rich in fish; game may be had on Gros Islet.

Leaving the anchorage it will be better to take the Sugarloaf Passage, passing either to the northward or southward of the 6-foot patch. In the former case, stand to the NW. until the south side of Pâté Islet is in one with Pâté Point, which mark will lead 100 yards north of the shoal.

In the latter case, run out with the church on an N. 89° E. (east mag.) bearing; when the NW. hill of Cabrit is open of Sandy Point you will be westward of the patch.

Tides.—It is high water, full and change, at this group at 6h. 45m.; the rise averages from 18 to 22 inches, but it is much influenced by the winds.

Terre d'en Bas (St. Paul).—Its shores are but slightly indented, and free of danger to within 200 yards. At its north end, about ¼ mile from the shore, is the small, low, rocky islet called Pâté, bold and steep-to on its east side, but it is foul on its west side to nearly midway between it and Pâté Point, at which distance is a shoal of 15 feet, thus contracting the passage between them to the breadth of 200 yards. By bordering on the shore of Terre d'en Bas, a vessel may run if necessary through this channel, and have not less than 6 fathoms water.

There is anchorage, but only for fine weather, on the west side of Terre d'en Bas, just to the northward of Gros Cape, the SW. extreme; and on the east side of the island there are two small coves convenient for droghers.

Grand Islet (St. John), about 800 yards southward of Redonde Islet, is 554 feet above the sea. Off its west end are the rocky islets Coche and Augustins, the channels between being narrow and only fit for boats.

These three islets are bold, but foul ground extends off them in many places for about 400 yards. Southwest Channel between Terre d'en Bas and Augustins Islets carries deep water, but off the west end of the latter a reef projects for nearly 400 yards. The SE. extreme of Cabrit Islet, in line with Boisjoli Point N. 41° E. (N. 42° E. mag.), leads through in mid-channel.

Great Cay Channel between Grand Islet and Redonde is free danger, but the 10-foot patch west of the latter should be given a ber

AVES ISLET.

Aves Islet, in latitude 15° 42′ N., longitude 63° 37′ 46″ W., is called from the multitudes of sea birds of various kinds which freq

it. The island is about 10 feet above the level of the sea. It is of coral formation, and is skirted by a reef on the NW., north, and south sides. On the west side there is anchorage and a landing place. The islet appears to rise from a bank of soundings of considerable extent, which has not been minutely examined, but which seems to be irregular in depth. Fishermen from St. Eustatius and other neighboring islands visit the island in March and April to gather sea bird's eggs, which are taken to St. Thomas and sold in large quantities. No fresh water is to be found.

The tide rises about 3 feet; the flood runs to the NW.

Landing is sometimes impracticable on account of rollers.

The islet may be seen at a distance of 8 miles during the day, but at night not farther than 2 miles.

Anchorage will be found with the middle of the islet about NE., with a bottom of sand and rock. Care should be taken to anchor on a sandy spot, which may be easily picked out by the eye. The fishermen who resort to Aves Islet state that the anchorage inshore, or within ½ mile of the landing place, is not good, and that when a ground swell sets in the water breaks heavily. On account of this ground swell, vessels are occasionally prevented from leaving the island for several days, and a detention of three weeks has occurred.

The sea birds usually visit the islet about the beginning of March, and the egg season ends at the same time as the fishing season.

There are no trees on the islet, and the vegetation is very scanty; the grass, however, is about 6 inches high. There is no appearance of guano now.

During the fishing season a schooner makes three voyages between Aves, St. Thomas, Saba, and St. Eustatius Islands.

DOMINICA.

Dominica has been in possession of Great Britain since 1783. It is of volcanic origin, with lofty rugged mountains running through the center of the island from north to south. The Soufrière, near the southern end of the island, has several openings, around which sulphur in large quantities can be obtained. In the Roseau Valley there are several boiling sulphur springs, the principal one being 4 miles from the sea, and on the Wotten Waven Estate.

About 6 miles NE. of Roseau, and more than half way across the island, on top of a high mountain and surrounded by others more lofty, is a lake of fresh water covering several acres. The valleys are fertile and watered by numerous streams, which abound with excellent fish, and there is an abundance of game in the island. The division of the year is into the wet and dry seasons, although rain falls at all times of the year. The only difference is, that a much greater quantity falls in the rainy or hurricane season, beginning in July and ending in October, than at any other period. The average temperature in Roseau, in

a period of five years, was 79.40, average maximum 83.93, and the minimum 74.88.

The population is 26,841 (1891).

There are several good roadsteads on the western side of the island, the principal of which is Roseau, the capital of the island. Woodbridge Bay, on the north side of the town, has also good anchorage.

Climate.—The southern part of the island is healthy, mild fevers alone prevailing, as in other healthy parts of the West Indies. The town of Portsmouth and the northwestern part are considered unhealthy.

Government.—Dominica belongs to the general establishment of the Leeward Islands.

The local government is vested in a commissioner, aided by an executive council of 7 members and a legisiative assembly of 14 members.

Caution.—Vessels sailing under the lee of Dominica should be on their guard against the heavy squalls which come off the high land and through the deep valleys, blowing with great force during the strong trades. Off Soufrière Bay and the Layou Valley are the two most dangerous places. When the trades are light calms are frequent.

Cachacrou, or Scott Head, the SW. point of Dominica, a small promontory 234 feet high, and connected to the island by a narrow neck, is a conspicuous object, and when seen from the north or south clear of the land appears as an island. S. 89° W. (west mag.), $\frac{1}{8}$ mile from the north part of the head, is a rock with 7 feet on it at low water. Scott Head should not be approached to within a distance of $\frac{1}{2}$ mile.

Soufrière Bay is north of Scott Head, and $1\frac{1}{2}$ miles wide; this can not be recommended as an anchorage, as it is very steep-to.

Point Michelle.—On the point is a well-built Roman Catholic church, with a large conspicuous cross south of it. Off this point, with the church south of N. 89° E. (east mag.) and 300 yards off shore, a vessel may anchor in from 5 to 8 fathoms. Care must be taken to let go the anchor smartly, as the water deepens so suddenly that drifting a few hundred feet will change the depth from 10 to 20 or 30 fathoms.

Tides.—To leeward of the island no dependence can be placed on the turn of the tide. For several days the set may be north or south, with the direction of the coast, the strength in some places being two knots an hour; and within a distance of 10 miles, the set may be quite in opposite directions. On the windward side the flood and ebb are regular; off Point à Peine the flood runs with a velocity of $1\frac{3}{10}$ miles per hour. Off the NE. part of the island the flood attains a velocity of [illegible] miles per hour; but the ebb, only $\frac{1}{2}$ mile an hour, is hardly perceptible.

Roseau.—The town stands on one of the few sloping points found on the coast of Dominica, and immediately south of the Roseau River. The table-land of Mount Bruce, dotted over with old military buildings, overlooks the town. Fort Young and the conspicuous square-built courthouse are slightly higher than the other buildings in the southern part of Roseau. The spire of the Roman Catholic cathedral is the most

conspicuous object, and is distinctly seen when approaching from the north or south.

The United States is represented by a consular agent.

Supplies.—The market at Roseau is generally well supplied. Beef can be obtained at 12 cents per pound, pork at the same price, and mutton at 16 cents per pound. The island vegetables, of great variety, are excellent and cheap, and fruit is plentiful. Vessels lying here water from the river.

Telegraph.—The telegraph cables, connecting the island with all the principal West India Islands and the United States, are landed in Woodbridge Bay, a short distance north of Roseau River.

Lights.—Two vertical white lights are shown from a flagstaff in Fort Young. A landing pier extends about 66 yards in a SW. direction from the mole. On the head of this pier a lantern light is shown, showing red to seaward and white to the land. There is a mooring buoy for mail steamers, from which is shown a red light when the steamers are due.

Dues.—There are no light dues. Tonnage dues are 26 cents per ton on all cargo landed or taken aboard. Vessels taking fruit on board are exempt.

Anchorage.—Anchorage off Roseau can be had opposite Fort Young, in from 12 to 15 fathoms water. The precaution of letting go the anchor smartly must be strictly observed, as the distance between the depths of 9 and 30 fathoms is only about 150 yards. The anchorage off the town can not be recommended, as it is very steep and there is scarcely room for a small vessel to swing toward the beach.

Tides.—It is high water, full and change, approximately, at Roseau at 1h. 30m. Springs rise one foot 6 inches.

Woodbridge Bay is 1¼ miles wide, and lies between Roseau on the south and the high land of Mount Daniel on the north. A conspicuous row of palms, running in an easterly direction and leading up from the Goodwill Estate, which is in the southern part of the bay, is an excellent guide. The table-lands at the back of the bay, intersected by ravines, are much lower than Mounts Bruce and Daniel. Off the north point of the bay rocks extend for 200 yards, and, on a coast so steep and free from dangers, show out conspicuously.

Anchorage can be obtained in from 10 to 12 fathoms, 300 yards from the beach, with the Goodwill Chimney just open to the southward of the conspicuous row of palms bearing S. 74° E. (S. 73° E. mag.), and Scott Head touching the shingly point of Roseau River.

Water may be obtained from a river in Woodbridge Bay, but the beach being rough and stony, it is attended with much inconvenience.

Layou River.—The coast from Mount Daniel runs in a NNW. direction, with slightly indented bays. Layou River, the largest in the island, is just 6 miles from the shingly point of Roseau River; when seen from the westward the entrance may be easily distinguished by

the lowness of the land. The source of the river lies near the foot of the Couronne Hill, which is comparatively low when seen with Diablotin to the north, and Trois Pitons to the south.

Good Anchorage for droghers can be obtained north or south of the entrance to the river, 400 yards from the shore, the depths being 8 and 10 fathoms. The northern anchorage is most frequented by small craft shipping wood or sugar. In a SW. by S. direction from the entrance of the river the water is very deep, and at anchoring distance off shore there are 40 fathoms. Wood in large quantities is shipped from this river.

Grand Savanna is the largest sloping piece of land on the western side of the island. This land is generally extremely parched in appearance, with little or no cultivation.

Anchorage.—The western point of Grand Savanna brought to bear N. 67° E. (N. 68° E. mag.), distant about 600 yards, and in from 10 to 20 fathoms, rock and sand, is the best anchorage ground. Closer inshore there are several patches of mushroom rocks, which a vessel's cable is likely to foul and be difficult to recover.

Wood and Water.—A small river immediately north of the Grand Savanna is favorable for watering, and wood can be obtained at $2.75 per cord.

Barbers Block is a conspicuous hill 5 miles to the northward of Grand Savanna. When seen from the north or south it is, as its name denotes, like a barber's block, the facial part being the summit and shoulders of the hill. From a westerly view it makes like a sharp cone.

Prince Rupert Bluff is a steep bluff surmounted by two remarkable hills, known as the East and West Cabris. To vessels coming from northward or southward they appear as islands, but they are joined to the shore by a neck of low, swampy ground. This prominent peninsula forms the north side of Prince Rupert Bay.

Prince Rupert Bay is the best anchorage in Dominica. In the NE. part of the bay and facing the beach is the small and dilapidated town of Portsmouth. The Roman Catholic Church, with its tall spire, stands a few hundred feet from the shore. The Methodist Chapel, a white building, is ½ mile inland and on the foot of a long, low spur. Morne au Diable stands to the NE. of the bay, the spurs from its summit meeting those from Mount Diablotin, at the back of the bay, in a neck about 600 feet high.

Supplies.—This bay is the best and most convenient place for obtaining wood and water. Wood is brought alongside at about $3 per co The Indian River, which is south of the Roman Catholic Church, i good place to water from. A market is held in the town on Saturd and is generally well supplied.

If bound to this bay from the eastward, it will be better to pass windward of the island and round its north end to avoid the risk being becalmed under the high lands.

Anchorage.—The most convenient anchorage is in about 8 fathoms, sandy bottom, with the Roman Catholic Church bearing N. 50° E. (N. 51° E. mag.), and the extreme of Prince Rupert Bluff N. 57° W. (N. 56° W. mag.). North or south of this position the anchorage is good, but not so convenient for obtaining wood and water.

Douglas Bay is directly north of Prince Rupert Bluff. Small vessels visit this place for firewood. Anchorage may be found in from 5 to 8 fathoms, sandy bottom, 300 yards off shore. From the north point of Douglas Bay to Cape Melvill, the NW. point of Dominica, the coast is cliffy and steep-to.

Point Jaquet lies 2 miles eastward of Cape Melville, the coast between is a bold and lofty cliff, 1,000 feet high.

La Soye Point.—The coast from Point Jaquet to the SE. continues its rugged character until in the neighborhood of La Soye Point, where landing may be had. A small anchorage of 4 fathoms is formed by La Soye Point and Reef stretching to the NW., but is very confined, scarcely allowing a small schooner room to swing at her anchors; vessels are steadied by hawsers made fast to the shore. A pier is built inside the point and the landing is easy.

Crumpton Point is the northeastern point of the island.

The Coast.—The character of Dominica in the NE. quarter presents a distinct contrast when compared with any other portion. The land rises from the sea less abruptly, the soundings off the coast showing a continuation of this gradual slope, 100 fathoms being found 3½ miles off shore. Mounts Concorde and Grand Bois, in the NE. are, respectively, 2,106 and 3,034 feet in height, the latter being 3 miles from the coast.

Captain Scott Rock, the only danger off the windward side of the island, is under water, and lies 500 yards from the first point north of Pagoua Bay. There are 16 and 18 fathoms on the eastern side of the rock, the sea breaking heavily over it in strong trades.

Pagoua Bay.—The northern shore of this bay, known as North End, trends round to the north and west to Petit Marigot, one of the few landing places on the windward side of the island.

St. David Bay lies midway between the north and south points of Dominica. On its south side is a small rocky islet, which, with an adjacent promontory, affords shelter for droghers. With a northerly wind a heavy sea sets in, making it difficult for vessels to put to sea. The anchorage is only safe with the wind south of ENE. In the valley is the well-cultivated estate, Castle Bruce. All its produce is shipped in droghers, which anchor under the rocky islet. A large pier is being built near the center of the bay. A conspicuous range, 2,400 feet high, rises over St. David Bay, and runs to the northward almost parallel to the coast for nearly 5 miles, terminating near Pagoua Point.

Point à Peine is one of the most eastern points of the island. On either side is a deep indentation known as Grand Marigot on the north,

and Petit Soufrière on the south. Over Point à Peine is a sharp hill, which rises to the height of 1,044 feet. The point forming the south part of Petit Soufrière Bay is Rosalie; south of this is an estate of the same name, at the foot of a deep valley, which commences but a few hundred feet from the top of one of the highest mountains.

Mount Paix Bouche, 1,585 feet high, rising over the dark, steep, and rugged cliffs, is the continuation of a sharp and defined ridge of hills on the SE. part of the island, the highest point being 3 277 feet above the sea. The coast here is very steep, the depth of 100 fathoms being found at little more than ½ mile from the shore.

Point Mulatre is 2 miles northward of Mount Paix Bouche, and is the commencement of a regular line of cliffs. La Plaine, on which stands a Roman Catholic Church, is on the most level part of this land, and is distant 3 miles from Point Mulatre. The Grand Soufrière Range, 3,554 feet high, rising over Point Mulatre and la Plaine, are connected by ridges with the main chain of mountains which runs through the island.

Grand Bay is the principal and safest anchorage on the windward side of the island. The largest and best cultivated estate near the bay is Geneva, with a water mill ½ mile from the beach. Grand Bay terminates in a comparatively low point, called Carib. Under this point and close inshore small vessels may anchor in from 5 to 10 fathoms and find shelter during the greatest strength of the trades, when the wind is north and east. When the trade becomes slack and inclined to veer round to the SE., the anchorage is not safe.

Morne Fous, 2 miles east of Scott Head, is a remarkable conical cliff, rising to the height of 1,251 feet. When viewed with the higher land as a background, the steep cliff which falls almost perpendicular to the sea has a most striking appearance, and when seen clear of the land it appears as a cone. The eastern extreme of this cliff is known as Pointe des Fous.

MARTINIQUE.

Martinique Island was settled in 1635 by the French, to whom it now belongs. Its area is about 380 square miles, one-third of the surface consisting of plains, the rest being mountainous.

This island is very lofty and irregular in height, and may be readily distinguished by three remarkable mountains of different forms, rising far above the general chain which runs through the whole of the island from NW. to SE., and may be seen about 45 miles off. The most northern of these is Mount Pelée, 4,428 feet above the sea, rising nearly miles to the SE. of Cape St. Martin, and its summit, when seen from distance, appears rounded, and presents nothing remarkable. The tons du Carbet, which rise 3½ miles from the western shore, between Bays of St. Pierre and Fort de France, are a group of conical pea with very steep and abrupt declivities, the most elevated being 3,4 feet high; but their summits being generally in the clouds, are seld

visible. At the SE. end of the island the Vauclin Mountain rises to the height of 1,657 feet, and has the appearance of a flattened cone. It rises at the east end of a chain of hills, which are divided toward the south into two branches, one terminating at Saline Point, and the other uniting itself with the steep ridges that command the bays of Fort de France on the north, and Grande Anse du Diamant on the south.

The NE. and west shores of Martinique are clear, bold, and steep-to, from the Sugarloaf Rock on the NW. side of Trinité Bay, round to Fort de France, and from Remiers Islet at the south side of entrance to Fort de France, SE. to Grande Anse du Diamant; but the south, SE., and east shores are irregular, deeply indented, and dangerous, particularly the latter, which is skirted by low islets and reefs, extending about 2½ miles from the coast, and should be very carefully approached.

The soil is generally formed of pumice mixed with decayed vegetable matter; in the southern part being more fertile than the northern, where the land is barren and rocky.

The population of the island is about 165,000.

Within the last few years extensive central factories for the manufacture of sugar and rum have been established at various places on the shores of the island. The system pursued of purchasing sugar cane from the planters and manufacturing the products in large quantities with every appliance of modern skill and science has been of very great benefit. Government is administered by a governor and a privy council, aided by a colonial council.

Climate.—The year is divided in Martinique into two periods of unequal length—the wet season from July to October, and the dry season lasting the rest of the year. The dry season only merits its name in comparison with the other, as a very considerable amount of rain falls during its continuance, and although the showers do not last very long they are copious and frequent.

The weather during the rainy season is much more variable and the rains heavier than during the so-called dry season.

The amount of moisture in the air is very great. The average range of the barometer is from 30^{in}.0 to 30^{in}.12, but on the approach of a hurricane it has been known to descend as low as 29^{in}.53.

At a height of 6½ feet above the level of the sea the maximum temperature in the shade has been found to be 95° F. and the minimum 68° F., while the mean yearly temperature is 78°.8 F.

Winds.—During the dry season the winds are generally between east and NE., without varying much either in direction or force; but during the rainy season they are far less regular, varying from ENE. to west, passing by the south. This is not only the most unhealthy season of the year, but also that of hurricanes, which frequently occur between July and October, and are often accompanied by more or less violent shocks of earthquake and heavy rollers. Hardly a year passes, in fact, without earthquake shocks at Martinique.

Signal Stations.—The following are the signal stations in the colony, with which vessels can communicate by means of the International Code:

Fort de France.—On the northern extremity of Fort St. Louis. Latitude 14° 36′ 07″ N., longitude 61° 04′ 30″ W.

St. Pierre.—On Bertin Place. Latitude 14° 44′ 35″ N., longitude 61° 11′ 04″ W.

Le Prêcheur.—On Mount Folie. From this station vessels are signaled coming from Dominica Island and St. Lucia Channel. Latitude 14° 47′ 25″ N., longitude 61° 13′ 23″ W.

The longitudes depend upon that of St. Marthe Battery, determined telegraphically in 1876 as being 61° 11′ 12″ W.

The Pearl Rock of the NW. coast may be passed on either side. Sailing ships, however, had better keep a little farther off shore, to avoid the calms under the high land, and the same vigilance must be exercised here that is required to leeward of all these islands, to guard against the squalls which rush down through the valleys.

St. Pierre Bay lies between Point La Mare on the north and Point Carbet on the south, the shore between them being low and sandy.

St. Pierre.—The roadstead is entirely open to the westward; and from July to November, when the trade winds are interrupted and hurricanes and rollers occur, it is by no means a safe anchorage.

On the shore is the town of St. Pierre, the chief commercial port of the island, and having a population of 38,000.

The sanitary condition is very good. The prevalent diseases are malaria and dysentery. Yellow fever becomes epidemic about once in eight or nine years, but never endemic.

The authorities to visit are the mayor and captain of the port. Salutes can be returned from St. Martha Battery.

The United States is represented by a consul and vice-consul.

Anchorage.—The best anchorage for men-of-war is a little to the southward of St. Marthe Point, about 400 yards off shore, in 20 fathoms of water. The bank of soundings extends a little farther off shore here than abreast of the town, is less steep, and is called the Plateau du Carbet.

On the edge of the bank there is a buoy, outside of which there is no good anchorage.

The anchorage for merchant vessels extends from St. Marthe Point northward to the River Pères, the northern boundary of the city. French vessels occupy the space south of Place Bertin, those under other flags being moored farther to the northward.

In approaching the anchorage of St. Pierre, although the vessel may seem to be very close inshore, the anchor should never be let go till the lead shows that the anchorage has been reached.

Caution.—Since the hurricane of August, 1891, vessels must anchor northward of the range on St. Marthe Battery to avoid fouling the anchors and chains which now strew the bottom of the old anchorage.

The buoys are all sunk or out of place. February, 1892.

The Currents in the offing from St. Pierre Road generally set to the southward.

Supplies.—Water of excellent quality can be procured. Casks can be filled in the boats by iron pipes leading from the fountain near the landing place.

Provisions and ship's stores can be had here of good quality. No coaling facilities.

Telegraph.—The West India and Panama Telegraph Company have an office here, the submarine cable connecting the island with Dominica and St. Lucia and all parts of the world.

Steamers.—Regularly between New York and Martinique.

Hospitals.—There are two hospitals. The military has a capacity for 200 patients; cost, $2.20 per day. The civil hospital is in charge of Sisters of Charity; cost, 80 cents a day.

Pilots.—A pilot will quickly board a vessel if signal is made. Their headquarters, the office of the captain of the port. They will use their own boats to run hawsers to buoy. Pilotage is not necessary, but compulsory. Pilots can be had here for the east coast of Martinque.

Pilotage.—Vessels between 60 and 100 tons, $8.60; 100 to 150 tons, $13; 150 to 200 tons, $16.40; 200 to 250 tons, $20; 250 to 300 tons, $23.60; 300 to 350 tons, $27; over 350 tons, $30.60.

Dues.—Stamp on inward manifest, 5 cents. Permit to load and unload, $2.60. Passport, $1.20. Sanitary dues, 3 cents per ton. Anchorage dues, $5. Water tax, 2 cents per ton. Light dues, $4. Buoy, 2 cents per ton. On pilotage, light dues, and buoy, 10 per cent additional is charged. Stamps for outward manifest and clearance, 16 cents.

Boat Landing.—The regular boat landing is at the head of the pier of the Bertin Place lighthouse. The pier is of wood and kept in excellent condition. No charge for man-of-war boats.

Lights.—A fixed white light is exhibited from a mast on the summit of St. Marthe Point, visible in clear weather 5 miles. On the same point, westward of the former, is a fixed green light visible 2 miles. The white and green lights in line lead to the anchorage. (The masts from which these lights are shown are not readily made out in the daytime until close-to, then by their triangular bases.) A red fixed light, visible 9 miles, is exhibited at an elevation of 57 feet from a lighthouse in the south extremity of Place Bertin.

Le Prêcheur (The Preacher) is a village 4 or 5 miles north of St. Pierre, where small coasters moor. Some fresh provisions can be obtained here; there is a convalescent home in connection with the hospital of St. Pierre.

Directions.—Vessels bound to St. Pierre Road from the eastward generally pass round the north end of Martinique, which is bold and steep-to, and presents no danger. In approaching the road from either the north or south, the shore must be kept close aboard. The current generally sets to the southward.

The most prominent objects in approaching the roadstead from the northward and eastward are the towers (white) of the Mouillage Church, shown on the chart, and the statue of the Virgin Mary. The latter, constructed of white marble, forms a very conspicuous landmark against the green background above and around it. It is situated on the edge of the bluff, above and a short distance to the left of the range on the St. Marthe Battery. When first sighted it looks very much like a monument. The battery is overgrown with verdure and hard to make out until close in to the anchorage. Running in with the statue east picks up a good anchorage.

Carbet Village.—One and a half miles southward from St. Pierre is the village of Carbet, built on the beach in a very picturesque position. It is recognized by a church with a very slender spire.

The coast from St. Pierre to Point Negro is formed by cliffs, intersected by bays frequented by coasters.

Anse de la Case Pilote is a small anchorage about 4 miles to the NW. of Negro Point. It is seldom visited by large vessels.

Anse de la Case Navire is a small bay 1¼ miles to the NW. of Negro Point, in which there is good holding ground, in 8 or 9 fathoms of water, about 200 yards from the shore. Care must be taken to shoot gently into the bay under easy sail, for the bank is so steep that there is a depth of 36 fathoms about 200 yards farther out, over rocky bottom. The best berth will be found from abreast of the battery to abreast of the westernmost houses. There is a rivulet of excellent water at the village.

Fort de France Bay lies between Negro Point and Cape Solomon, the bold headland which forms the north side of Grande Anse d'Arlet, 5½ miles south of it. Its width, however, may be more properly confined to the space between the point and Ramiers Islet, 3½ miles distant, and from this line it extends eastward about 5 miles. The bottom is irregular, and varies considerably in depth, but its shores are so indented as to afford several secure anchorages against all winds. The passages to them, however, are intricate, and the assistance of a pilot is necessary.

Pilots can be obtained at Fort de France as also at St. Pierre for the east coast of Martinique. Pilotage is obligatory. The rates of pilotage and dues the same as St. Pierre.

Fort de France, the capital of the island, lies on the north side of the bay. It is built on a low plain bounded on the west by the River Madame and is the headquarters for the French naval forces in the West Indies. The governor of the island resides here.

Mail steamers ply regularly.

At several places on the shores of Fort de France Bay central sugar factories, or *usines*, have been established.

With the assistance of a pilot the approach to these factories is no difficult for vessels intending to load there.

The United States is represented by an agent.

Supplies.—All sorts of supplies, provisions, and naval stores may be obtained with ease at Fort de France.

Coal in small quantities may be obtained from the Compagnie Générale Transatlantique or from the French Government supply. There is no coal on regular sale.

Water is supplied from the government water boats.

The Anchorage for men-of-war lies off the town and is protected by Fort St. Louis, built on a narrow peninsula, rising abruptly from the sea and separating the anchorage called Flamands Roads from the Carénage.

A bank of gravel and rock extends about ½ mile to the south and SW. of the peninsula, its edges being marked by two square black buoys, with beacons elevated about 14 feet, carrying a sphere and a revolving plate with the word "Stop" written on the buoys, about 600 yards from the south point of the fort, in 4½ and 5 fathoms water.

There is a wreck S. 22° W. (S. 23° W. mag.) of Fort St. Louis on the shoal, near which a boat buoy is moored. The wreck is above water.

Good anchorage will be found with the flagstaff on the fort bearing N. 53° E. (N. 54° E. mag.) and Negro Point from N. 46° W. (N. 45° W. mag.) to N. 80° W. (N. 79° W. mag.). Small vessels may proceed farther in towards the town, according to their draft. This anchorage is secure from November to July; but during the hurricane season vessels of war are secured in the bay of Trois Islets.

Boat Landing.—The regular landing is at the pier just west of Fort St. James. No charge for man-of-war boats.

Buoyage.—The system of buoyage adopted at Fort de France is that all black buoys are to be left on the port hand and red buoys, with horizontal white band, on the starboard hand on entering; parti-col-colored buoys are elbow buoys.

Caution.—Vessels coming to the anchorage from the southward in thick weather should be careful not to mistake the electric light for the one on Fort St. Louis.

Directions.—The approach to the anchorage in Flamands Roads presents no difficulties whatever. Should it be necessary to go farther in, a pilot should be taken. To anchor at night bring the light on Fort St. Louis to bear N. 72° E. (N. 73° E. mag.) and steer for it. Anchor on that line when Negro Point light bears N. 68° W. (N. 67° W. mag.). The channel leading to the cove east of Fort St. Louis, called the Carénage, is buoyed, and the largest ships can haul alongside of the harves there for repairs and coal.

Dock.—An excellent dry dock has been completed, belonging to the ·ench Government. It is 393.6 feet long, 360.8 feet on blocks and .1.5 feet beam, and drawing 27.8 feet. The dock charges are 65 cents r ton for the first day and 9½ cents per ton for each succeeding day.

The Tide is very weak in Fort de France Bay; it is high water at ll and change at 4h., and the rise is about one foot.

Lights.—On Negro Point, in the fort, is shown 54 feet above the sea a fixed white light, and should be visible 7 to 8 miles. A fixed red light with two fixed white sectors is shown from the SW. part of Fort St. Louis. It shows red seaward between N. 62° W. (N. 61° W. mag.) and S. 62° E. (S. 61° E. mag.) shows white shoreward on each side of red sector over an arc of 45°. The light is shown at an elevation of 27 feet, and is visible 9 miles. A fixed white light is shown in the Carénage. The buoy at the SW. extremity of St. Louis Bank shows a white light, and the buoy at the SE. extremity a red light, and the buoy on the SW. point of Carrière Point a white light, on the arrival and departure of mails or when required. The docks of the Compagnie Transatlantique packet are lighted by electric lights when the steamers are in. Two lights are shown at the boat landings; one at Flamands Roads west of Fort St. Louis shows red to seaward, white inshore, the other is at Carénage on south landing.

Cohé du Lamentin is to the eastward of the Carénage and nearly 2 miles farther up the bay is an inlet forming a secure anchorage; south of it, on the south side of the bay, is another secure anchorage. This part of the bay is nearly cut off from the western portion by coral banks extending from both northern and southern shores of the bay, and the assistance of a pilot is necessary.

Passe des Trois Islets.—The three shoals on the south side of Passe des Trois Islets are each marked by a buoy. A buoy is moored in 26 feet water at 800 yards NW. of Pointe la Rose. The north side of Passe des Trois Islets is marked by three buoys; the westernmost lies in 23 feet water, the middle and easternmost buoys in 28 feet; the entrance to Cohé du Lamentin lies between these two buoys.

Banc de la Vierge is a rocky knoll, about 400 yards in extent, with a depth of 8¾ fathoms, and should be avoided in coming to an anchor. When on the knoll, the flagstaff of Fort St. Louis bears N. 69° E. (N. 70° E. mag.) and Negro Point N. 29° W. (N. 28° W. mag.).

Banc du Mitan is a small rocky patch lying on the south side of the general anchorage in Fort de France Bay. It has only 4 fathoms water on it, and lies with the flagstaff of Fort St. Louis bearing N. 33° E. (N. 34° E. mag.) and Negro Point N. 46° W. (N. 45° W. mag.). It is marked by a conical red and black buoy in horizontal stripes.

Banc du Gros Islet is a shoal lying still farther to the southward, and nearly midway between Negro Point and Ramiers Islet; the least water on it is 20 feet. Between this bank and the shore to the southward, the bottom is uneven and rocky, the depth varying from 4½ to fathoms; it shows itself by the light color of the water, and is nam the White Bank. It is marked by a beacon buoy, painted black a red in bands, moored in the middle of the bank; the beacon is a 14 feet high and carries a sphere and revolving plate.

Grande and Petite Anse d'Arlet and Petite Anse du Diam. Bays.—The two former are separated by a bold promontory ca'

Bourgos Point. All three of these coves have sandy beaches and afford good temporary anchorage ¼ mile off shore in from 7 to 10 fathoms of water. There are no hidden dangers and the shore is perfectly bold as far as the east side of the Morne du Diamant.

Anchorages on South Side of Martinique.—Eastward of the Morne du Diamant are the following anchorages for small vessels: Grande Anse du Diamant, Anse du Marigot, Anse du Ceron, and Anse des Trois Rivières. At the latter place a central sugar factory has been established. Pilote River has also an anchorage off its mouth. In entering, pass eastward of St. Luce Cay, which is surrounded by reefs. In approaching the anchorage of Grande Anse du Diamant the Olbian Reef must be avoided, lying ½ mile from the shore on the east side of the bay and having 6 feet of water on it.

Le Diamant or Diamond Rock lies SE. about a mile from the Morne du Diamant, which forms the SW. point of Martinique, with a clear channel between, named the Fours. The rock is very remarkable, nearly square in form, each side about 800 yards long, and rises almost perpendicularly to the height of 574 feet above the sea. It is inaccessible except at a small spot on the west side, where landing may be effected under favorable circumstances. The south and west sides of the rock are steep-to, but to the northward a small bank of 5¼ and 6 fathoms extends to the distance of ¼ mile, and 200 yards to the eastward there is little as 4 fathoms water. At ¾ mile S. 68° E. (S. 67° E. mag.) from the rock, there is also a small detached coral bank with 4½ fathoms water on it. Morne du Diamant rises abruptly from the shore to the height of 1,568 feet, and may generally be seen at a great distance; it is bold and steep-to.

Cul de Sac Marin between the shoals is so narrow that large vessels can not work in under sail. The water is so clear that the shoals and rocks can be easily seen and avoided. The entrance is obstructed by the Singe Bank, having only 3 feet of water on it, and forming two channels at the entrance. The southeastern channel is the best. The eastern point of the entrance is flat and marshy, and is called Marin Point. The best anchorage will be found with this point bearing S. 44° W. (S. 45° W. mag.) and the Piton Crève Cœur, a hill 663 feet high on the eastern side of the bay S. 74° E. (S. 73° E. mag.). In this berth a vessel will have 12 fathoms of water and good holding ground. The anchorage nearer the town is only fit for coasters. At the head of the bay, near the village of Marin, a central sugar factory has been established.

There are beacons and buoys for facilitating the navigation of the channel.

Saline Point, the south point of the island, is very low, and reefs extend off about ¾ mile; about ½ mile to the SE. of the point is the small islet of Cabrit.

Cabrit Islet is also low, and foul ground extends for ½ mile SW. of the islet. The shore should not be approached in this neighborhood nearer than a mile.

Directions.—Vessels coming from the south or SE., and bound to either of the anchorages just described, will first make the Vauclin Mountain, which will be a guide to Point Saline.

The bank of soundings is so steep, that by day the eye will greatly assist the lead, the discolored water being easily seen from aloft. Having passed Dunkerque Point, large vessels should approach Borgnesse, the west point of entrance to Cul de Sac Marin, carefully, to avoid the shoal ground off St. Anne, and anchor about ¼ mile SW. of the latter point, if under sail, and be ready to warp or tow in, as the breeze slackens towards the evening.

If bound to the westward, having passed Cabrit Islet, a N. 74° W. (N. 73° W. mag.) course for 10½ miles, will lead to abreast the Diamond Rock, when hug the shore close aboard, and choose an anchorage as before directed. It is necessary, however, to observe that when under the lee of the high lands, preparation must be made to meet the sudden and violent gusts which rush down the gorges of the mountains, and which are the more dangerous as they come upon a vessel when she is probably becalmed and quite unmanageable. A vessel may pass between the Diamond Rock and the coast, but no real advantage will be gained.

East Coast.—The eastern shore of Martinique, as far north as the peninsula of Caravelle, is bordered by coral banks and reefs which extend off shore to a distance of 2½ miles. There are several passages through these reefs leading to harbors and anchorages inside.

Vauclin Point is the extremity of a fork of the great mountain of that name, which separates the Cul de Sac Vauclin from those of Grenade and Sans Souci to the northward of it. The ridge slopes uniformly but rapidly, terminating at a small steep hill on the shore, 216 feet above the sea. The main bank and outer reefs may be said to end at the Vauclin Pass, but the coast continues to be skirted by inner ones nearly 1½ miles off the coast, which incline gradually to the shore, and extend about ½ mile at Cabrit Islet.

Vauclin Pass is only available for small coasters. To enter from the southward bring the little hill on Vauclin Point to bear N. 37° W. (N. 36° W. mag.), which course will lead through between the reefs, which are only 200 yards apart towards the inner end of the channel. The depth varies from 7 to 8 fathoms.

Brigot Pass, about 1½ miles to the northward of the above, is narro and too dangerous for any vessel to attempt without the assistance a pilot.

Pinsonelle Pass, 2½ miles to the northward of Brigot and the fi to the southward of Mitan, is formed between the Sans Souci Cays a Pinsonelle Cay. To run through, bring the Vauclin Mountain

S. 55° W. (S. 56° W. mag.) bearing, upon which line there will not be a less depth than 4¼ fathoms.

Caution.—The establishment of central sugar factories, or *usines*, at various points on the east coast of Martinique and of neighboring ports of entry for the exportation of their productions renders it necessary to caution shipmasters as to chartering their vessels to load at those ports, unless they have some previous knowledge of the locality.

Such factories have been established at Simon François, Galion, and St. Marie. All these ports can be reached without much difficulty, but they are difficult to get away from, owing to the strong NE. wind blowing directly on to this coast and the heavy sea.

Mitan Channel lies nearly midway between Thiery Isle and Mitan Cay, 2¼ miles north of it. The latter is a small low cay on the inner edge of the reef. It lies east 2¼ miles from Rose Point; about a mile N. 18° W. (N. 17° W. mag.) of it is the Loup Garou, a similar small cay.

Thiery Isle is the easternmost of a group of small islets lying about 1½ miles from the nearest shore It is about 100 feet high and its summit has the appearance of a rounded cap covered with brushwood; 1½ miles S. 68° E. (S. 67° E. mag.) of it, and on the outer reef is a dry, flat, rocky ledge, called Pinsonnelle Cay, which forms the SE. danger of the Mitan Channel. The mail steamer Mississippi was wrecked on this cay in 1869.

Caracoli Channel is formed between Caracoli Point, the SE. end of the peninsula of Caravelle and the north end of the coral bank which extends hence to the southward about 2½ miles from the shore along the whole of this side of the island. There are several small channels through it, but the Caracoli is by far the best for vessels bound to any of the anchorages within it.

Caracoli Point is a remarkable bare, steep, rocky headland 95 feet above the sea; the land slopes from the heights above, and at its foot a flat bank of coral extends for about 200 yards. The north end of the main bank bears from it S. 23° E. (S. 22° E. mag.) one mile; nearly midway between, however, lies a small coral bank, with 5½ fathoms water, causing a heavy roll of the sea, and should be avoided by bordering towards the point; it may be generally distinguished by the discolored water.

Directions.—With the wind at NE. or even ENE., and moderate weather, vessels bound out from either Galion Bay or le Havre du Robert will find the Mitan Channel preferable to the Caracoli. In general the sea is much smoother to the southward of Mitan than at any other part of the reef. Leaving the former, care must be taken to avoid the Loup Marseillais, which is a narrow ledge, with 10 feet water on it, lying about ½ mile N. 80° W. (N. 79° W. mag.) of Loup Garou; it generally breaks. Leaving le Havre du Robert, Mount Tartane open of Ramille Islet leads eastward of the reefs which extend off Chardon Isle

and Rose Point, and having brought Mitan Cay to bear N. 10° E. (N. 11° E. mag.) about a mile, haul to the wind through the channel.

Culs de Sac Vauclin, Sans Souci, Simon, and Fregate are small coves, where small vessels may, with the assistance of a pilot, find good anchorage. At Simon there is a central sugar factory. As the water is everywhere very clear the shoals are easily seen, particularly in good weather and when the sun is astern.

François Anchorage, where a central sugar factory has been established, is 8 miles to the southward of Caracoli Point. The town lies at the head of a small bay about ¾ mile long, and the anchorage is well sheltered and has excellent holding ground. It is, however, so surrounded by reefs and shoals, and the channels are so narrow, that the assistance of a pilot, is indispensable.

Le Havre du Robert, at its entrance between Chardons Islet and Grotte Rock, is not more than about 900 yards in breadth, but becomes much wider within. The south side of the channel is bounded by reefs nearly dry which extend off in every direction from Rose Point, and from which rise the two small islets named Rose and Chardon. The edge of the reef is nearly 200 yards from the latter, and is steep-to. Grotte Rock on the north side, is steep-to, and is connected with a bank of coral and gravel (barely covered by the sea) to a small islet of the same name, which is also united in a similar manner to Ramville Islet at the south point of Galion Bay.

Anchorage.—About 1¾ miles to the westward of Grotte Rock is the islet of Petite Martinique, to the westward of which is the best anchorage for large vessels. Here smooth water and good holding ground will be found, with from 5 to 6 fathoms of water. Abreast of the town from 13 to 16 feet of water will be found.

The town of Robert lies on the NW. shore of the bay. It contains about 6,500 inhabitants, and moderate quantities of provisions may be obtained. The rise of tide is about 5 feet, but it depends on the force of the trade winds.

Directions.—Having entered within the main bank by Caracoli Channel, there is no difficulty in making or entering le Havre du Robert, for the reefs are nearly dry, and readily distinguished by the discolored water. It is not, however, so easy to beat out of, being very narrow, and the eye must be the chief guide. Having passed outside the islets a course may be shaped either for the Caracoli or the Mitan Channel.

Galion Bay, on the south side of the peninsula of Caravelle, is 4 miles wide at the entrance between Ramville Islet, which is about feet high and has a bushy and rounded summit, and Caracoli Po but the bay becomes contracted towards its inner end, and betw Banane Point and Brunet Point, it is not more than a mile in brea The western shore is much indented, and forms several bays, wh however, are skirted and obstructed by numerous coral shoals, an heavy swell sets in. The River Galion, with its sugar factory abo

mile within its mouth, empties into the bay to the SW. of a remarkable conical wooded islet of the same name. The only safe anchorage against all winds is on the north side of the bay, under the west side of Brunet Point, which lies 2½ miles to the SW. of Caracoli Point, and is steep-to and bold. Within Caracoli Point is the Cul de Sac de la Tartane, but it is choked with reefs, and of no importance.

Directions.—Having entered the Caracoli Channel, in running down the south side of the Peninsula of Caravelle, the shore should not be approached within ½ mile until Brunet Point bears N. 35° W. (N. 34° W. mag.), when haul in and anchor as convenient, about ¼ mile from the eastern shore, with the point bearing S. 57° E. (S. 56° E. mag.), and a large house north of it N. 22° E. (N. 23° E. mag.) in 4½ fathoms water. In leaving this anchorage a sailing vessel will have to beat out, and care must be taken to avoid the two small banks, Loup Banane and Loup Charpentier, which lie without the reefs which skirt the whole of the south side of the bay; the former has 9 feet water on it, and lies S. 1° E. (south mag.) 1,200 yards from Brunet Point; the latter is nearly 1¼ miles S. 23° E. (S. 22° E. mag.) of the same point, east of Banane Point, and has 13 feet on it. To the eastward of these shoals, the bay is free of danger till nearing the inner side of the main bank, on which, immediately in front of the bay, and nearly 3 miles S. 18° E. (S. 17° E. mag.) of Caracoli Point, there is a dry spot called Loup Bordelais.

Pilots.—It is said that pilots can not always be depended upon, as they frequently do not present themselves till the vessel is close to the anchorage and no longer needs their assistance.

Caravelle Peninsula, of which Caracoli Point is the SE. extremity, is of very irregular breadth, varying from ½ mile to 2 miles. The narrow isthmus which connects the peninsula with the main land is only ½ mile wide and separates the two bays of Trinité and Galion. Farther to the eastward the land is higher, gradually rising to the summit of Mount Tartane.

The Caravelle Rock, 1¾ miles north of the peniusula, affords an excellent landmark for vessels approaching this part of the island. It is steep-to, quite barren, and its peaked summit has been completely whitened by birds. From a distance it looks like a vessel under sail. The channel between Caravelle Peninsula and this rock is deep and free from danger.

Light.—On the summit of Caracoli Hill, at the extremity of Caravelle Peninsula, and ⅛ mile inland, is a gray tower, which exhibits, at 410 above the sea, a fixed white light, visible in clear weather about 12 miles. Caravelle Rock is 2 1/10 miles north of the light.

Trinité Bay affords a safe anchorage during ordinary winds, and, next to St. Pierre and Fort de France the most important commercial port, having a population of over 7,000. The bay is somewhat sheltered to the northward by a shallow, rocky bank, on which there are several dangerous shoals. The irregular depths on the bank raise so rough a

sea that large vessels from the northward had better pass between the western end of the bank and the shore than try to cross it.

The northern side of Caravelle peninsula forms the eastern shore of Trinité Bay. It is composed of low, reddish cliffs and sandy bays, skirted at a distance of 200 to 600 yards by a coral reef, on which the sea generally breaks.

St. Aubin Isle is an excellent landmark in approaching Trinité Bay. This isle is high and steep, with a round, bushy summit. Its north side is steep-to and clear of danger, but to the ESE. it is foul for ¼ mile, and its south side is joined to the shore by a coral reef nearly dry in places.

Loup Ministre has 6 to 9 feet of water on it, and as the sea breaks heavily nearly at all times, it forms a useful guide to the entrance of the bay.

Between this reef and Caravelle peninsula there are many other reefs, which make the passage to the eastward of the reef dangerous.

The Mitan Bank is small, carries a depth of only 11 feet, and does not always break. It bears N. 33° E. (N. 34° E. mag.) from the fort, S. 68° E. (S. 67° E. mag.) from the highest part of St. Aubin Isle, and lies on a line between the fort and Loup Ministre.

Loup de St. Marie.—The western end of the bank on which the Loup Ministre lies terminates about 1½ mile north of St. Aubin Isle, but rather less than one mile farther N. 68° W. (N. 67° W. mag.) is the Loup de St. Marie, with 5¼ fathoms of water on it. With strong NE. winds the sea breaks heavily.

There is a clear channel between this shoal and the west end of the Loup Ministre Bank, as well as between it and St. Marie Islet, in front of the village of the same name, and joined to the mainland by a sandy bank.

The Beau Sejour mill (situated on the isthmus connecting Caravelle Peninsula with the mainland) kept open a little to the eastward of St. Aubin Isle carries a vessel to windward of the Loup de St. Marie; kept open to the westward it leads to leeward of the same danger.

Water.—The best watering place in Trinité Bay is under the house at Beau Séjour.

Directions.—Approaching Trinité Bay from the northward keep well to windward and do not bring the Caravelle Rock to bear northward of N. 89° E. (east mag.) until the windmill of Beau Séjour comes nearly in line with St. Aubin Isle, then haul up on the leading mark for the channel either to windward or leeward of Loup St. Marie, and when Isle St. Marie bears S. 84° W. (S. 85° W. mag.), shape a course to pass abo ½ mile to the eastward of St. Aubin Isle.

Good outer anchorage will be found in 9 fathoms with Fort P bearing S. 39° W. (S. 40° W. mag.) and the mill of Beau Séjour S. E. (S. 56° E. mag.); but if more convenient proceed farther in, the c being a sufficient guide, as the shoal ground on either side will be d tinctly seen.

With the wind from east or SE. a vessel must beat in, and in order to avoid Loup Ministre Bank, should it not break, St. Aubin Isle should not be brought to the southward of S. 11° E. (S. 10° E. mag.) till it is within one mile of the vessel.

With the prevailing winds it is usually difficult to leave the bay. In beating out, the eastern reefs, which are visible, should be kept aboard until the reef stretching off 400 yards from Fort Point can be cleared. After this is done the edges of the channel are plainly marked by the breakers. Care must be taken to keep clear of the Mitan Bank.

Pilots for this bay and adjacent anchorages are generally to be found in the offing.

St. Marie Islet, in front of the village of the same name, is connected to the shore by a narrow sand bank. A reef is reported to skirt the shore southward of the islet and to extend from the islet two-thirds of the distance across the bay.

St. Marie Anchorage.—Immediately to the westward of St. Marie Islet is the mouth of the river of the same name. A central sugar factory has been established near the mouth of the river, but the anchorage off it is very much exposed and is unsafe.

The locality is marked by the chimneys of the *usine*. Vessels lie in from 5 to 8 fathoms of water about ½ mile off shore.

Coast.—From Sugarloaf Point to Macouba Point, the north point of the island, the coast is bold, steep-to, and affords no anchorage. It consists of small sandy bays, separated from each other by bold, rocky bluffs, and is exposed to the full force of the wind and sea.

Tides and Current.—The time of high water at Martinique depends greatly on the strength of the trade wind, but in general, at full and change, it is at 4h. From the same influence the rise and fall at le Havre du Robert is about 5 feet, while at Fort de France Bay it is only about one foot. The stream is entirely influenced by the great equinoctial current, consequently, near Saline Point on the south, and the Pearl Rock on the NW. side of the island, the stream runs generally to the westward. On the east side, with the wind at NE., it runs to the SW., and with SE. winds to the NW., and sometimes at the rate of 3 knots. On the west side, however, close in shore, there is scarcely any stream at all, and after a prevalence of light winds it is sometimes found running strong to the NE. and east.

In the channel between Martinique and St. Lucia the current is frequently imperceptible.

CHAPTER XIV.

THE WINDWARD ISLANDS.—ST. LUCIA TO BARBADOS INCLUSIVE.

ST. LUCIA.

St. Lucia Island was first settled by the French in 1635, and after various changes came into the possession of the English in 1803, and has ever since remained in their hands. The traces of French occupation are still apparent, a large portion of the population speaking that language.

The government is conducted by an administrator, who is subordinate to the governor-in-chief of the Windward Islands, aided by an executive and a legislative council.

General Description.—The island is 23½ miles long, north and south, by 12 miles in breadth. It is mountainous, and broken up by gorges, water courses, and ravines, and for the most part is covered with forest and tropical vegetation. Piton Morne Gimie, the highest peak in the island, is 3,145 feet above the sea; the great and small Pitons, of 2,619 and 2,461 feet, respectively, occupy isolated positions on the SW. part of the island. These latter peaks are very prominent marks in approaching the island.

La Sorcière, 2,221 feet high, when seen from the NE., appears as a perfect cone, but from the SE. as a round-backed mountain; these mountains are seldom entirely free from clouds.

There is a great variety of timber, used for building and various purposes; logwood is plentiful.

The island is proportioned into eight districts: D'Ennery, Dauphin-Gros Islet, Castries, Anse La Raye, Soufrière, Choiseuil, Vieuxfort, and Micoud-Praslin.

Population in 1885 numbered 40,681.

Steam launches ply from Port Castries to Soufrière, Choiseuil, Laborie, and Vieuxfort. This, except by special messenger, is the only means of communication between Port Castries and the other parts of the isla[illegible] Trading vessels must make Port Castries their first port of call, as be the only port of entry.

The climate in the valleys and lower parts of the island is hot a unhealthy; on the elevated parts cool but very damp. The temperat during the summer months at Port Castries varies between 88½° a 70° Fahr., and in winter between 85° and 65° Fahr.

The easterly trade wind blows more or less throughout the year, but is always squally.

Rain falls at times all the year round, but it is much heavier from June to October than at other times. Annual rainfall at Port Castries, between 1883 and 1886, was 73.2 inches to 118.2 inches.

The products are sugar, rum, molasses, cocoa, and some spices.

Tropical fruits are tolerably plentiful, also some kinds of vegetables.

Fish, may be caught with pots, line, and seine, and turtles can be obtained.

Wild hogs can be found in the forests; waterfowl, snipe, and partridges are found in the valleys.

The Weather Coast practically includes the whole north and east coast of the island.

Pointe de Cap, the north extreme of the island, is bold but comparatively low, consisting of several small peaks, partially wooded, from 429 to 535 feet high; the summit is in lat. 14° 06¾′ N., long. 60° 57½′ W.; it is free from dangers, and the 20-fathom line extends from about 2½ miles off shore.

When beating round this point it is recommended to hug the shore, and so avoid the current.

Pointe Hardie.—The NE. point of the island is sloping and well defined; there is a dangerous rock ¼ mile east of it, named Gros Loup, which generally breaks.

Esperance Harbor is a narrow creek, but affords neither protection or room for vessels other than pirogues or native boats frequenting it for shipping logwood.

Between Pointe Hardie and Esperance Harbor the bottom for nearly ½ mile off shore is foul and uneven, and should be given a wide berth, In fine weather, however, landing at Case en Bas and Fayolle may be effected through the boat channels.

From Esperance Harbor to Cape Marquis the shore is rocky, bold and steep-to, with moderately high peaked hills in the rear of it.

Cape Marquis (pronounced Machi in the colloquial) is an abrupt rocky point 75 feet high, at the extremity of a steep slope from a conspicuous peaked hill named Gaïac. Immediately south of this cape, in Petit Trou, there is a landing in ordinary weather. From here the coast trends to the southward and SSW.

The Coast from Anse Marquis to d'Ennery is for the most part wild and cliffy. Landing may be effected under favorable circumstances at Pointe Dauphin and Anse Marquis. The summit of Pointe Tariti is a conspicuous cone, 424 feet high. There is a rock awash 400 yards off Pointe Tortue.

At Trou Halhal there is a good landing in ordinary weather.

La Bouche, at its entrance, is a conspicuous mushroom-shaped rock 50 feet high. Pointe Mammelles, as its name implies, consists of a series of high cones terminating in a sandstone cliff 572 feet above the

sea. There is a rock 98 feet high off it, and another 139 feet high to the southward of it.

In Fond d'Orr bay small sloops anchor occasionally to ship sugar, but it is unsafe, and a swell rolls in on the beach.

Porte d'Ennery is the only place on the weather coast that may be called an anchorage; a slight protection is afforded by the island and peculiar shaped rocks at its entrance, inside which the anchor may be dropped as convenient. It is used occasionally during crop time by the smaller class of sailing vessels, and sometimes steamers anchor there for an hour or so, but in case of the former, before sailing in, arrangements must be made at Port Castries for being towed out, as it is not possible to beat out without great risk. The cost of being towed is about $100. The hospital is conspicuous from seaward.

Port Praslin (pronounced prâly) is 2 miles south of Porte d'Ennery, and is now almost deserted, there being only a few huts; it is small and shallow.

Pointe Chapeau is a remarkable double point on which a red patch shows in the morning sun. In Anse May Boyau there is a tramway leading to the Fond Devaux Estate, from which small droghers occasionally ship sugar and logwood.

Port Micoud may be described as a good boat harbor. None but the smallest sloops venture in, and the passage, which is on the south side of the entrance reef, is very narrow. The village is small and poor.

Pointe Vierge is low, flat, and prominent.

Port Savannes is sometimes used by small sloops, and sugar is shipped there from the estates in the vicinity; its access is difficult and the ground very foul to the southward; there is, however, a boat channel inside the reef fronting this shore. The Saxannes Estate, with its chimneys, shows up well in the morning sun, with Mount Victorin immediately behind it.

Cape Moule à Chique, the south extreme of the island, is a fine, bold, and precipitous headland, in latitude 13° 42¾′ N. and longitude 60° 57′ W., with a double summit of nearly equal height on the eastern point. At a long distance it appears as an island on account of the low land immediately north of it. It may be passed close-to, but $1\frac{2}{10}$ miles southward of it is a coral shoal named Fond Blanc, with 6 fathoms on it, which it is advisable to keep clear of.

The 20-fathom line extends nearly 4 miles south of this cape.

South Coast.—Vieux Fort Bay.—This bay has excellent anchorage, the protection being afforded by the Moule à Chique Peninsula. The only danger in the bay is the coral bank extending 1,400 yards S of the town, having two shoal heads, la Caille Reef, awash, and a fathom patch at the outer extremity.

This is best avoided by using the lead and bearings of Point Cæs Sailing vessels will have to beat up to the anchorage, the winds be somewhat baffling. Steamers, however, can get Fort Cross Hill

feet high, immediately east of the pier) in line with Mount Bellevue N. 30° E. (N. 30° E. mag.) and anchor at a convenient distance from the town. The holding ground is good. The town is a poor one, and not considered healthy, in consequence of the trade wind blowing over the swamp and marsh at the back of the town.

Water can be obtained here, but it is not particularly good. Also fish, fruits, and vegetables, and fresh meat.

Laborie is a small village 3½ miles NW. of Cæsar Point, and is connected with Vieux Fort by a good road. The bay does not seem to be much frequented. The anchorage is confined; the entrance is narrow, and a swell often sets into it. A steam launch calls in from Port Castries four times a week.

The Laborie Reefs break heavily, except in calm weather. From here to River Dorée the ground is foul for nearly ½ mile off shore, the principal shoals being the Balembouche Rocks.

Balembouche Rocks.—These rocks lie ½ mile east of the River Dorée, and 400 yards from the shore, but the shoal water off them extends to the southward for nearly ½ mile.

They break as a rule when there is any swell; and there is a passage for boats inside.

When standing in toward the shore, keep Maria Islet well open of the point immediately west of the Anse Noir Estate, bearing S. 82° E. (S. 82° E. mag.).

West or Lee Coast.—From Point Beaumont the land trends to the north and NNE. The two Pitons or Sugarloaves are so unmistakable that they need no description. The water off them is very deep, and the squalls come down occasionally with great violence.

Soufrière.—This is a picturesque town, clean and well ordered, and although hot it is said to be very healthy, which is probably caused by the deodorizing influence of the sulphur springs, the smell of which impregnates the air for miles around, and may be noticed some distance out to sea. The sulphur springs are about 2 miles outside the town.

It is unfortunate that Soufrière possesses no anchorage; small vessels can, however, drop their anchor in 20 fathoms, about 150 yards from the beach, haul their sterns into the shore, and secure to the trees.

Directions.—In entering Soufrière Bay the wind must be guarded against, as it rushes off from the valleys with such force as to endanger the spars; therefore, before entering, sail should be reduced, and if the breeze outside is strong, a reef taken in. When beating in, the wind will be found more steady on the south side than on the north.

Caution.—Having approached to within a short distance of the town a strong hawser should be sent to the shore and made fast to one of the trees on the beach in front of it, and another hawser coiled in a boat ready to leave the ship and bend on, if required. The moment the end of the hawser is on board all sail must be quickly furled, for

should it part it would be useless to drop the anchor, as it would immediately drag into deep water.

It will be necessary to hang the vessel by the stern by a stream chain from either quarter, and drop a bower anchor on the edge of the bank, in case the wind should veer to the westward; this, however, never takes place except in the hurricane months, and at all other times the sea is as smooth as in a mill pond.

Roseau Bay.—Vessels anchor here during crop time, about 400 yards from the shore, and ship sugar from the Roseau factory, a tramway and pier being constructed for that purpose.

Marigot Harbor is a very small but protected anchorage, and is seldom frequented.

Grand Cul de Sac Bay is an open bay, ½ mile broad, situated 2 miles south of Port Castries, and affords good anchorage to all sized vessels. Its northern shores are cliffy, precipitous, and steep-to. The head of the bay is a sandy beach, about the center of which the River Cul de Sac discharges itself, off which the shoal water extends for nearly 400 yards. The south shore line consists of rock and sand, which, except off the Telegraph hut, is fronted by a coral shoal extending 200 yards from the shore.

When entering from the northward, Ciceron Point can be passed close to; but from the south, Point Bananes must be given a good berth, on account of the rocks extending 200 yards north of it. The pier head in line with the factory chimney, and Seine Point bearing south (south mag.), is a good position for most vessels to anchor in 13 fathoms, mud. The submarine cable enters the sea at the Telegraph hut in this bay.

Port Castries, on the west or lee side, about 7 miles from the north end of the island, is one of the most secure harbors in the West Indies; it is about one mile in length ESE. and WNW., averaging ¼ mile wide, and although the distance between the shoals is only from 300 to 400 yards, and the wind blowing generally down the harbor (light and baffling sometimes), yet a handy, well-manned vessel should be able to beat in. Steamers should experience no difficulty.

At the head of the harbor is the town of Castries, the capital of the island. The town is well laid out, but its streets are ill paved and most of the houses unpretending. Great improvement, however, has been effected during the last few years in the harbor and wharfage accommodation.

A concrete wharf has been constructed on the north side of the town with a depth of 27 feet alongside, and a good channel dredged up to

Dredging is still proceeding. Vielle Ville and Cocoanut Shoals be left, as they protect the harbor from heavy seas.

Land at the head of the harbor has been reclaimed.

Above the town of Castries, on the south side, rises the Morne Fortuné, 845 feet high, on which stands Fort Charlotte and the militia quarters. The climate there is cool and healthy. The administra

resides here temporarily. These buildings are conspicuous from seaward. The place is being strongly fortified and garrisoned. The new barracks and buildings on the hills on both sides of the entrance furnish excellent marks for identifying the position of Fort Castries.

Salutes can be returned. The authority to visit is the administrator.

Coal.—A large quantity (about 20,000 tons) is generally kept in store. Vessels can be coaled at the rate of from 70 to 80 tons per hour if alongside the wharves, at which there is a greatest depth of 27 feet. There are five coal hulks, in addition to the stores at the wharves, of capacity from 750 to 98 tons. Lighters are kept loaded ready for delivery. Coaling can be carried on at all times, day or night. Average price, from $6 to $6.50.

Telegraph.—There is telegraphic communication with the United States and South America.

Hospitals.—The island is divided into four hospital districts, each having a hospital. There is also a lunatic asylum and a hospital for lepers.

The Victoria Hospital, opened in 1887, on Bananes Point, is a fine and the most imposing building in the harbor. All vessels liable to tonnage dues pay a hospital tax, which entitles them to use the hospital.

Port Charges.—Tonnage dues, 24 cents per ton; harbor master's dues, 5 cents per ton; clearance, 96 cents; hospital dues, 1 cent per ton; 72 cents per ton on all coal landed in Port Castries. There is also a cargo tax of 48 cents per ton on cargo landed from regular steamers, but these steamers are exempt from other port dues.

Pilotage.—Steamers in or out, between 6 a. m. and 7 p. m., $4.86; between 7 and 10 p. m, $7,29; after 10 p. m., $9.72. Sailing vessels, not exceeding 50 tons, 96 cents; between 50 and 100 tons, $1.92; between 100 and 200 tons, $2.88; over 200 tons, $4.86. After 7 p. m. and before 6 a. m., double the above rates.

For moving a vessel in harbor, $1.20; after 7 p. m., $2.40.

Lights.—The Vigie is the name given to the promontory, 295 feet high, which forms the north shore of the harbor; it is low about its junction with the mainland, gradually rising to a wedge-like summit at its extremity. On its highest part stands an octagonal lighthouse, painted with vertical black and white stripes, from which is exhibited a fixed white light, visible 12 miles. It has a signal staff, from which vessels sighted are signaled, and a gun which is fired at 8 p. m., and on the arrival of the mail steamer.

The Tapion, on the south side of the entrance, is a semi-detached tabular-shaped rock, 80 feet high, reddish in color, not easily made out from the northward. A fixed red light is exhibited from an old battery on its summit; visible 2 miles.

When a vessel enters or leaves the harbor at night and the harbor master is informed, a red light is shown from the outer perch, which

marks Vielle Ville Shoal and a green light from the perch on Cocoanut Shoal.

Range lights are shown to mark the middle of the channel.

The front light, fixed red, is situated on western wharf of Market Place, 330 feet S. 87° W. (S. 87° W. mag.) from the Government flagstaff, and is at present shown from a temporary tripod, pending completion of the piling of the wharf.

The rear light, fixed green, bears S. 59° 30′ E. (S. 59° 30′ E. mag.) distant 2,500 feet from the front light, which bearing, with the lights in line, leads into the harbor.

The lights are shown from skeleton iron frames with day marks.

Perches.—Vieille Ville Shoal is marked by 3 perches. The old (outer) perch on that shoal has been moved about 100 feet westward into 22 feet of water.

The middle perch is in 10 feet of water 500 feet S. 68° E. (S. 68° E. mag.) from the outer perch.

The eastern perch is in 10 feet of water about 467 yards N. 89° E. (N. 89° E. mag.) from the outer perch.

Supplies.—Fresh provisions (not plentiful) can be obtained at the following rate: Beef, 14 cents per pound; mutton 16 cents per pound; vegetables, 4 cents; bread, 5 cents; fish, turtle, and poultry also. Water, conducted by pipes from the head of Castries Valley, is free, but for drinking purposes rain water is preferable. The supply is insufficient.

Buoy.—A red can buoy, surmounted by a diamond-shaped top, painted yellow, has been placed to mark quarantine ground, SW. from Vigie lighthouse. Vessels liable to be quarantined should anchor to the westward of this buoy, leaving a clear channel between their anchorage and Tapion Rock.

Directions.—From the northward, vessels of light draft may haul close around Vigie Point, but those of heavy draft, in order to avoid the 29-foot patch 300 yards from the point, should keep the Tapion Rock in line with one of the buildings on Morne Fortuné, until the Victoria Hospital is shut in by Cocoanut Point. From the southward, all vessels must avoid the Tapion Shoal. Labrellotte Point, bearing about N. 34° E. (N. 34° E.), kept well open to the west extreme of the Vigie, will clear it until the town of Castries opens out clear of Cocoanut Point.

At the mouth of the harbor the vessel will be met by the harbor master, who, when a clean bill of health is presented, will give pratique, without which no vessel is allowed within 300 yards of the wharf.

A steamer can then proceed into harbor, steer between the Cocoanu and Vielle Ville Shoals, and anchoring or proceeding to the coal wha as required.

Sailing vessels must beat up by the lead, and estimate distance fr shore or shoal; the wind is often baffling, but sometimes permits a sl to lay right into the anchorage.

Vessels are not allowed to make fast to buoys without the harbor master's sanction.

When bound to Port Castries from Barbados, pass round the north end of the island, and, in shaping course, make a large allowance for a lee or westerly current, which generally prevails; this route will avoid the squalls and baffling winds on the west side of the island.

A Bank of soundings from 10 to 27 fathoms was lately reported by the French cruiser La Florie off the NE. of St. Lucia, between 14° 03′ and 14° 14′ N. and 60° 36′ and 60° 47′ W. longitude.

This has been unsuccessfully searched for by the French and English men-of-war.

Anse du Choc is a bight about 3 miles in length between Port Castries and Labrellotte Point, in which a vessel may anchor in 6 or 8 fathoms of water, to the westward of Choc or Rat Islet (and on which the Yaws Hospital now stands), near the center of the bay.

About ½ mile NE. of Choc Islet is the entrance to the Choc or Union River.

When approaching this bay be careful to avoid a rocky shoal, nearly one mile long and 400 yards broad, parallel to, and distant from the shore about ½ mile, its north end joining Labrellotte Point at the north extreme of the bay.

The south end of the shoal lies about NW. from the Choc River; to avoid it keep Pigeon Island open of Labrellotte Point.

Gros Islet Bay, is about 4 miles NNE. of Port Castries, is less confined, and a good anchorage.

It is formed between Pigeon Island on the north, and Fourreur, or Barrel of Beef, a small round rock 18 feet high, on the south, which lies S. 34° W. (S. 34° W. mag.) and N. 34° E. (N. 34° E. mag.) distant 1½ miles from each other, and, measured from this line, the bay is about one mile deep.

Pigeon Island is bold and steep-to, 341 feet high, 800 yards in length NE. and SW., and half that distance in breadth. On its south hill is Fort Rodney, and at its east end are the ruins of military quarters, and a very old tank contains good drinking water. It is about ½ mile from the shore, with only a boat channel between.

There is a passage for small craft between Fourreur Islet and the mainland.

The village of Gros Islet stands on its eastern shore, and is connected with Port Castries by a good road about 7 miles in length. There is a ...tering place in Trou Gascon.

Direction.—As there is no danger in entering Gros Islet Bay, both ...ints may be rounded at 200 yards. A sailing vessel will most prob... ly have to beat in; the best anchorage will be found with Gros Islet ... urch in line with a conical hill 314 feet over Beausejour Estate, bear... g S. 79° E. (S. 79° E. mag.), and Fort Charlotte on Morne Fortuné, ... en inside the summit of Labrellotte Point, S. 17° W. (S. 17° W. mag.) ... 10 fathoms of water.

Current.—Around the island of St. Lucia the current generally sets to the north and NW., being deflected by the trend of the coast, with a velocity varying up to 2½ knots; it divides off Point Brandon, Cape Moule à Chique, one part running along the south coast, the other up the weather coast; they would seem to meet again somewhere off the north coast according to their force and velocity, for, generally speaking, there is a small area off that coast which has less, or is free from current.

The appearance or absence of rips, and their unstable positions, would seem to indicate that the parting and meeting of the two portions of the stream varies according to their strength. When the current is weak, or there is none, it is probable that the tidal stream predominates, and it appears also to effect its velocity when strong. Perhaps, also, the tidal influence close inshore is stronger than that of the current, which may account for the eddies said to be reported by fishermen.

In the channels between the Windward Island the prevailing set of the currents is to the west, tending NW. The strength varies, but much increases in the vicinity of the shores of the islands, where it may attain a rate of 3 knots.

The U. S. S. Chicago experienced little current between St. Thomas and Dominica and Martinique; abreast these two islands a NW. current was felt, and approaching St. Lucia it ran with a strength of about 2 knots an hour. (December, 1891.)

ST. VINCENT.

St. Vincent Island has been in the possession of the English since 1783. A lofty range of mountains running north and south occupies the center of the island, Mount Soufrière, in the NW. end of the island, rising to a height of 4,048 feet. This mountain is volcanic, and may be seen at a distance of 55 miles. On its NW. side it rises abruptly, but on its NE. side it gradually slopes to an extensive plain.

The shores are almost everywhere bold and rocky except on the east side, where the slope is gradual, with several sandy bays, where coasters load produce for Kingstown, the capital of the island and place of export.

The climate is said to be healthier than that of any of the other West India Islands. Population about 45,000.

The government is vested in a governor, with an executive and a legislative council.

Kingstown Bay and Anchorage on the SW. side of St. Vincent is the principal anchorage, on the shore of which is the town of the same name, the capital of the island, which lies along the shore of the bay and is backed by the mountains.

Salutes can be returned.

The authority to visit is the governor, or in his absence the administrator.

Population is about 5,000. The city is very clean and healthy.

Supplies can be obtained at reasonable rates. Water is brought

the city in iron pipes; vessels water at the wharf—cost 30 cents per 100 gallons. Supplied free to vessels of war on application to port office.

Coal.—There is no coal.

Hospitals.—The Colonial Hospital accommodates about 60 patients. Patients pay $5 on entering, which is the only charge. There is a quarantine and a lepers' hospital.

Telegraph.—There is telegraphic communication with the other West India Islands and thence to the United States and Europe.

Steamers.—There are two regular lines to England. Mail connection with United States via Trinidad. Local mail to Georgetown and Chateau Belair.

Landing.—The only landing is at the pier in front of police yard. It is in good condition and free.

Port Charges.—Tonnage dues, 36 cents per register ton or per ton of cargo landed. Ballast, 72 cents per ton. Harbor dues on steamers, $9.72; ships or barks, $7.29; brigs or brigantines, $4.86; schooners or sloops of 40 tons or more, $2.43; from 20 to 40 tons, $1.92; below 20 tons, 96 cents.

Pilotage not necessary or compulsory. When a pilot is taken the fees are as follows: Sailing vessels under 100 tons, $2.40; over 100 tons, 2 cents for each ton in addition to $2.40. Steamers drawing 8 feet and under, $9.72; between 8 and 14 feet, $17; over 14 feet, for every foot or fraction thereof, $1.44.

Current.—In December, 1891, in entering the harbor the U. S. S. Kearsarge experienced a current of nearly 2 knots setting toward Johnson Point. This point should therefore be given a wide berth.

Directions.—Kingstown Bay is generally entered from the southward. Having closed with the south point of St. Vincent, which slopes gradually, steer along the land at the distance of about ¾ mile, when Young and Duvernette Islets on the NW. side of Calliaqua Bay, and the high land over Kingstown will be seen, and shortly the high bluff of Battery or Old Woman Point will come open. Pass this islet about ½ mile off and haul in for Cane Garden Point, the SE. extreme of Kingstown Bay, which slopes gently toward the sea.

If bound into the bay in a sailing vessel, haul close around Cane Garden Point, but take care not to be taken aback, and look out for the lofty sails, as the wind is often scant and unsteady and the squalls from the high land are heavy. A vessel may stand over to the western shore without fear, and having tacked, the best anchorage is in 10 fathoms water, dark sand and good holding ground, with the church bearing north (north mag.) about ¼ mile from the shore. If more convenient, a erth will be found farther out in 15 fathoms, with the church about N. 3° E. (N. 6° E. mag.) and Old Woman Point N. 82° W. (N. 82° W. mag.).

As the wind during the middle of the day frequently rushes down he valleys with great violence, be prepared to give the vessel a good cope of cable or she may drift off the bank. At night the breeze

generally falls light, a weather current sets round the bay, and should the anchorage be crowded, it may be necessary to steady her with another anchor. Off the pier there is a mooring buoy for the mail steamer.

Tides.—It is high water, full and change, in Kingstown Bay, at 3h. 0m., springs rise about 1½ feet, neaps one foot.

Signals.—There is a signal mast on Fort Charlotte which signals the approach of vessels.

Light.—A fixed white light 640 feet above the sea, visible 6 miles, is shown from Fort Charlotte.

Young and Duvernette Islets are on the south side of the island. The latter is the outer and smaller of the two, is conical in shape, 204 feet high, and surmounted by an old fort.

These islets are bordered on the east and south sides by a rocky bank extending off 200 yards.

There is a narrow 5-fathom channel between these islets and the mainland.

Calliaqua or Tyrrel Bay, immediately east of these two islets, is a secure anchorage, but is now only frequented by coasters. Between this bay and Young Island a reef runs 400 yards off shore to the southward. The bay has a convenient sandy beach for shipping cargo. Two rivulets run into it, and the anchorage is secure. The village is small. A pilot is necessary.

Lagoon.—On the east side of this bay is a snug little harbor protected by the reefs, called the Lagoon, with 6 to 9 fathoms water, mud bottom, but the entrance through the reef from the SW. carries only 2 fathoms.

Buccament Bay, about 2½ miles NW. of Kingstown, is noted for the stream of excellent water which flows into it. It lies NNW. and SSE., with a depth of 26 fathoms across, within 100 yards of the shore; a vessel may anchor at that distance off shore, a little to the northward of the river, in 17 fathoms of water.

Layu Bay.—About 3 miles to the NW. of Old Woman Point is Layu Bay, with 20 to 25 fathoms water at 200 yards from the shore. The SE. point is steep-to, and this side of the bay is sandy; the NW. side is rocky, and a small reef extends from the point.

Barrouallie Bay lies about 5½ miles to the NW. of Kingstown. Its north side is formed by some remarkable rocks called the Bottle and Glass, which are clear of danger, and have a boat channel within them.

Anchorage.—If coming from the northward, haul close round these rocks and anchor in 20 fathoms of water, sandy bottom, with the ro bearing N. 45° W. (N. 45° W. mag.) and the barracks N. 62° E. (N. E. mag.). The bottom on the north side of the bay is foul. The wi is so variable and unsteady under the highland that if intending remain any time it will be better to warp in, and drop a second anc to the eastward in about 12 fathoms. If coming from the southwa the shore may be kept aboard equally close, and the vessel may pr

bly shoot far enough in to drop the inner anchor first. The water being deep so close in the anchorage is only fit for small vessels.

Water may be obtained from a stream at the head of the bay.

Caution.—To navigate under the lee of highland, is generally extremely tedious and uncertain. A vessel may be becalmed for hours, or indeed days, when the trade wind is light. When it is strong, precaution is necessary, and the mariner should be prepared for the sudden gusts which rush with violence down the valleys. As the anchorages generally lie close to the shore, and the banks extend but little off and steep-to, if taken aback there may be some danger of getting on the rocks; the boats should therefore be ready to tow. Anchors must not alone be depended upon.

Coast.—From the Bottle and Glass Rocks to the NW. extreme of St. Vincent, it is all along bold, and a vessel may stand in to ½ mile from the shore. Between are several small bays.

Chateau Belair, the largest, affords anchorage at about 400 yards off its eastern shore in 13 or 14 fathoms of water, with the north point of the bay bearing N. 3° E. (N. 3° E. mag.) the west point S. 79° W. (S. 79° W. mag.) and the town S. 17° W. (S. 17° W. mag.).

In the middle of the bay there is no bottom with 50 fathoms, nor on the west side with 30 fathoms, at 100 yards from the shore. The landing is not good, and with northerly winds a heavy surf rolls in on the beach. Chateau Belair is separated from the little bay southward of it by Chateau Belair Island, which is about ¼ mile in length with a rock 7 feet high close off its southern point. Southward of this rock is a narrow passage carrying 6 fathoms water, which is used by boats and sometimes by droghers.

Wallibu Village is about 1½ miles north of Chateau Belair, off which exposed anchorage will be found in 17 fathoms 150 yards off shore, with the NW. extreme of Chateau Belair just open. This is the anchorage recommended for visiting the Soufrière, the landing is indifferent, but canoes can be hired that land passengers safely.

Coast.—The part of the island northward of a line from Chateau Belair to Black Point on the east coast is known as the Karib Country. The only land communication from the east to the west side of the island is by a track over the Soufrière, practicable for horses, part of the way. Native boats frequently go around from one side to the other.

De Volet Point.—From Wallibu the coast trends NNE. 3⅛ miles to De Volet Point, and is remarkable chiefly for its numerous and varied arp spurs. Morne Ronde Point, 154 feet high, shows as hummock from ie southward, and has a Karib village near it. A chain of small rocks ts out 50 yards from Larikai Point. De Volet Point stands out promi-ently, and near it is the Windsor Forest Arrowroot Estate. There good landing on the sandy beach in Grand Baleine, ½ mile eastward f De Volet Point, and also good water there. Quashie Point or Cape olle (locally, Copper Hole) is bold and prominent. Booby Rock is 10

feet high, with Fancy Pass inside, that may be used by boats in fine weather. The red shingle roofs of the Fancy Arrowroot Estate show well when the sun is shining on them.

Porter Point, 68 feet high, is sharp, cliffy, and conspicuous. In Owia Bay there is temporary anchorage in fine weather for small droghers, which ship arrowroot from the estate.

Owia Point, the NE. extreme of St. Vincent, is 245 feet high, with the houses of the estate on its summit. Cow and Calves, a chain of rocks, the highest elevated 45 feet, lie off this point. Espagnol Point is similar in shape to Owia Point, but without the well-defined summit, and it has no buildings on it.

East Coast.—From Espagnol Point the coast turns abruptly to the southward, and as far as Turema Point the country is cut by spurs and ravines, like those on the north coast. Between Turema Point, 70 feet high, and Black Point, the spurs are comparatively broad and flat, rising in gentle slope towards the Soufrière and Morne Garu Mountains. Some of the finest estates in St. Vincent, their buildings and chimneys conspicuous from seaward, are situated on these slopes. This part of the coast is lined with bowlders, on which the sea breaks heavily.

Piers.—There are wooden piers at Rabaka and Georgetown, from which sugar is shipped in boats specially constructed for the purpose. A buoy, to which droghers moor, lies off each pier.

The piers and buoys are private property.

Georgetown may be recognized from seaward by its square church tower, built of dark-colored volcanic stone.

Black Point, dark in appearence and well defined, is 54 feet high at its extremity, and easily recognized as the first point southward of Georgetown. The whole of the coast described above between Chateau Belair and Black Point is free from outlying dangers, and may be approached to ½ mile.

Current and Tides.—The main current, within a distance of 5 miles of St. Vincent, was always found setting to the northward, but within a mile of the coast tidal influence is felt; ½ mile southward of Calliaqua, Cane Garden, and Johnston Points, the ebb stream runs west and NW. about 2 knots, and the flood to the southward and SE. one knot, at springs. the streams apparently turning at high and low water by the shore, but subject to great irregularities from wind and current. The tide sweeps round Kingstown Bay, the flood to the westward, the ebb to the eastward, sometimes attaining a velocity of nearly 2 kn

Route to Barbados.—The passage from St. Vincent to Barba in a sailing vessel, is best made by working to windward between Vincent and Bequia, and when able to weather the Grenadines, stre to the southward for about 12 hours, and in 3 tacks Bardados will g ally be reached. The passage, at times, is performed in 36 hours.

THE GRENADINES.

The Grenadines form a chain of about 100 islands, cays, and rocks, 60 miles long north and south, lying between St. Vincent and Grenada.

They, with the adjacent islands, were settled by the French about 1650. They are now in the possession of the English Government.

The islands are of moderate height, none exceeding 1,100 feet, and have no offlying dangers. They may be safely approached either in the daytime or by moonlight, and have several channels between them.

The eastern edge of the bank, or 100-fathom line of soundings, is 10 miles from the islands, with depths between ranging from 10 to 25 fathoms, whilst the bank to the westward does not extend nearly so far.

Bequia Island, the northernmost of the Grenadines, is of irregular breadth, its coast line forming several bays.

Its population is about 900, all of whom are utterly lazy and apathetic. The island is attached to the government of St. Vincent.

Admiralty Bay, on the western side of Bequia Island, is about ⅔ mile deep, and in the inner part near the head, which is narrowed by shallows on either side, a vessel would be well sheltered from all winds except the SW., and when blowing from this direction, which is an exceedingly rare occurrence, would, in a measure, be protected from the sea, as it would be broken in passing over the Belmont Shallow, and the two banks projecting from the north side of the bay. The inner part of the bay is not of much extent, but deep enough for any vessel, and the channel to it between Belmont Shallow, bordering the shore of the bay on the south and the opposite bank, is clear, distinct, and traceable from its darker color and deeper appearance.

This part of the bay could only be entered by a large vessel under steam or by warping; the water is quite smooth, and small vessels work in.

Supplies.—Water is scarce and not good. Poultry may be had occasionally in small quantities, and sometimes fish, but no vegetables.

The Wash Rock lies at about 100 yards off the north point of Rocky Bay, at ⅓ mile southward of the NW. point of the island. To clear it keep the town of Kingstown, or Mount St. Andrew, in the island of St. Vincent, open of the NW. point of Bequia, bearing N. 11° E. (N. 11° E. mag.). A vessel of large draft from the northward, after passing the Wash Rock, should not haul up too much to avoid the 3-fathom bank extending SE. from Fort Point, the north extreme of the bay, until the leading mark is on, or she may anchor in 15 or 16 fathoms water in the outer part of the bay. All the banks in this bay, with less than 5 fathoms on them, assist the pilotage by the light-colored water.

Friendship Bay is a circular indentation, on the SE. side of Bequia Island, affording anchorage and shelter to vessels of 10 feet draft. It is formed by St. Elair Point on the east and the cay of the same name

on the west, the cay being joined by a reef to Bequia. The channel is midway between the cay and point. This place is frequented by American whaling schooners.

Quatre Isle and Cays.—Quatre Isle, 1⅛ miles south of Bequia, is 460 feet high, 1½ miles in length, narrow, with an indentation on the NW., and one or two projecting points on the east and south, forming little bays. There are three cays between it and Bequia, and Pigeon Islet, 220 feet high, lies ⅛ mile off its west end. These islets and cays, with the south part of Bequia projecting westward, inclose a large space, with moderately smooth and everywhere deep water, forming an open but safe anchorage at any time, excepting the hurricane season; even then, with steam power, it is as safe as any other place, and there is no difficulty in leaving it at all times.

There are four channels formed by these islets and cays, which may be taken either way by vessels with steam power, but under sail should only be used from east to west with a commanding breeze, as the currents are strong. As a general rule pass in the middle of each channel, except between Quatre and Petit Nevis (325 feet high), where keep nearer Quatre to avoid a shoal off the SW. end of Petit Nevis, on which the sea generally breaks. But as little can be gained either in distance or position by taking either of these small channels, neither of them should be used unless in cases of necessity.

Battowia Island is a bold-looking cliffy island, 686 feet above the sea, with the Bullet, an isolated lump 318 feet high, close to its north end, shaped somewhat like a conical bullet, which cannot be mistaken. To the NW. of the Bullet, distant 300 yards, is a breaker, but so near the land that it could scarcely be touched, unless by a vessel keeping unreasonably close. Between the islands of Battowia and Baliceaux is Church Cay and Reef. The narrow channels carrying 2 fathoms water on either side of it are fit only for small vessels with a fair wind.

Baliceaux Island is 1¼ miles in length, ¼ to ½ mile in breadth, and 430 feet high. A 5-fathom bank extends off its western side, on the edge of which with caution a vessel may anchor, but the water is never smooth, although there is no danger for vessels of small draft. There are two shallow patches close in on the NW., and a reef uncovered on the SW. side of the island. The landing is not very good. A few deer exist on the island, but none are to be found on any other of this group.

At the north end of the island is Cactus Cay, 63 feet high, and at a ¼ mile north of it is Black Rock, 41 feet high, with a 2-fathom shoal between.

Tides and Currents.—The edge of the bank is about 4 miles eastward of the two latter islands, and continues its northern direction about 10 miles north of Battowia Island; it then trends in the direct and passes close to Bequia without joining the St. Vincent Bank. The space between the two banks is, however, narrow, and not over 300 fathoms deep. In this channel the current and tide almost always sets

the westward near the middle, but the ebb tide makes to the eastward in a less depth than 70 fathoms.

At 6h., full and change, the ebb stream begins to run to the eastward, and advantage may be taken of it to work to windward during its continuance under the lee of Bequia, on the St. Vincent Shore, and between Bequia and the weather islets or cays; but a vessel will have little chance of making easting when the flood and current are setting westward. When the ebb stream sets to windward along the shore of Bequia Island against a strong trade wind, a heavy confused sea will be found in this channel.

All-awash Islet, 1⅛ miles east of the Pillory Rocks, is the prominent islet or rock called All-awash, 223 feet high, steep-to, and which can be passed on either side. A vessel can work to windward here with the assistance of the ebb tide.

Pillory Islets and Rocks.—Close off the north end of Mustique is Double Rock, 20 feet high, and ⅛ mile farther is Single Rock, 15 feet high; the channel between the rocks has from 7 to 8 fathoms water. The Pillories are three islets in a WSW. and ENE. direction, over a space of about ⅔ mile. They are from ¾ to a mile north of Mustique; the western islet is 65 feet high, the middle 85 feet, and the easternmost and largest 190 feet. Between these islets and Single Rock is a narrow passage carrying 3½ fathoms water. The above channels may be taken by small vessels from east to west, but only in cases of urgent necessity.

A group of rocks partly uncovered, and the largest 70 feet high, lies N. 68° E. (N. 68° E. mag.) of the Great Pillory; they are named the Pillory Rocks, and between them and the islets there is a clear channel ⅛ mile wide, with 8 and 9 fathoms water; but there is a sunken rock with 8 feet of water on it, and which generally breaks S. 62° E. (S. 62° E. mag.) distant ⅔ mile from the Great Pillory; and at only ½ mile from the Great Pillory in the same line is another rock awash, and always to be seen. It will be prudent to give these rocks a wide berth.

Mustique Island is the larger island of that name, 2½ miles in length one in breadth, and at its south end 475 feet high. The channel between the Mustiques has 7 fathoms water, and is clear of danger with the exception of the reefs extending 300 yards from Petit Coy and the SW. end of Mustique; as also the 1½-fathom shoal, on which the sea breaks, lying east, distant ½ mile from the south end of the island.

In anchoring in Grand Bay, on the west side of the island, a vessel should pass west and northward of the Montezuma Shoal, and enter between it and the north point of the bay, or make short tacks in the south part of the bay.

The east side of the island is skirted by reefs, and off it is Rabbit Islet with the Brooks, 60 feet high, and other rocks; but as there is no anchorage a vessel should avoid this side of the island.

There are cattle and sheep on Mustique Island, but if fresh beef is required, notice is required by the manager to catch and kill the animals.

Montezuma Shoal is about 350 yards in diameter, with only 3 feet water on it, and lies ½ mile from the north extreme of Grand Bay, or the middle point of the island. This shoal is extremely dangerous, as when the water is smooth it does not break, and can not be seen until too late to avoid it. A vessel may also anchor north of the shoal off Cheltenham.

Petit Mustique is 340 feet high and about ½ mile in length. A rock uncovered lies 200 yards off the south point of the islet, and another rock one foot above water, 800 yards southwestward of its west end, leaving a narrow channel between the latter and the island. The Petit Coy, 75 feet high, and surrounded by a reef, lies at about ¼ mile off the north extreme of the islet. The water is shoal for about 300 yards north of it.

Savan Islets form a group of small islets and rocks extending north and south over the space of a mile. The largest islet is about 600 yards long, 200 yards wide, 133 feet high, and, being covered with grass, has a bright green appearance when seen in the sun.

Savan Rock, 105 feet high, is remarkable for having whitish sides and somewhat the appearance of the Sail Rock, but from its being the southern of this group it can not be mistaken for the isolated Sail Rock. These islets and rocks are more or less skirted by reefs, and rise from a bank having from 4 to 10 fathoms water on it. Temporary anchorage will be found for small vessels NW. of the largest islet, but there is always a swell. The channel between this group and Petit Cannouan is about 3½ miles in breadth, and clear of danger.

Petit Cannouan is 3¾ miles northward of Cannouan. It is 600 yards long, 400 yards wide, and rises 222 feet high, with 10 to 16 fathoms water around it. Between it and Cannouan there are from 17 to 23 fathoms and no danger.

Cannouan Island is of an irregular outline, 3¼ miles in length north and south, and its northern part 1½ miles in breadth, where it rises to a peak 853 feet above the sea, but the middle part is not so high, or in one place more than ¼ mile across; the southern part projects westward and forms on that side Charlestown Bay, where there is anchorage. The island is more or less bordered by reefs, and on the SE. and south sides they extend off to about ½ mile.

Both the NW. and SW. points of the island are bold and may be passed at the distance of 200 yards; but it is not advisable to go so near the NW. point in a sailing vessel, as the peak checks the wind and causes flaws and eddies, but this will not occur near the SW. p The population is about 500. A large vessel should anchor in Cha town Bay in 17 fathoms water, sand, with the north points in lin 9° E. (N. 9° E. mag.) and the SW. point S. 51° W. (S. 51° W. m Small vessels may anchor close inshore. Within the 15-fathom lir soundings the water shoals suddenly.

To the northward of Friendship Point, the SE. extreme of the is

there is secure anchorage for small vessels inside a sandy cay and the reef. It should be approached from the SW. with smooth water. If the wind be fresh, a vessel should not attempt to pass Friendship Point, as it fronts the channel formed by an open space in the reef east of it, or to enter by this channel; and as this anchorage could only be resorted to on any particular occasion, a person with local knowledge should be obtained. Anchorage will also be found westward of Dove Cays.

About $\frac{2}{3}$ mile N. 67° W. (N. 67° W. mag.) of the NW. point of Cannouan Island is a small bank with $6\frac{1}{2}$ fathoms water on it. Vessels of large draft should avoid it, as with the heavy swell, and the doubt which always exists as to whether the shallowest water is absolutely known, it will be more prudent.

Mayero Island.—The next group southward consists of Mayero Island, the Catholic Islet and Rocks, and Tobago Cays and Reefs. Mayero Island, 347 feet high, is the largest, about $1\frac{1}{2}$ miles in length, nearly a mile in extreme breadth, and contains about 260 inhabitants, who live by fishing and raising a few vegetables. Catholic Islet and Rocks are about one mile NW. of Mayero Island; the islet is 166 feet, and the rocks, at about $\frac{1}{4}$ mile to the SW. of it, 77 feet high; the passage between them has 6 fathoms water, and may be taken with a fair wind in cases of necessity.

At 400 yards NW. of the North Catholic Rocks is a shoal with $3\frac{1}{2}$ fathoms water on it, which must be avoided by vessels of large draft. A rock 8 feet above water and a small sand cay, called the Dry Shingle, are connected to the islet on the east side at the distance of $\frac{1}{4}$ mile by a bank which encircles it. Between Mayero Island and the Dry Shingle is a good channel nearly 600 yards in width and with 5 fathoms water, for vessels from the northward for Mayero Anchorage.

Anchorage.—Good anchorage in 6 or 7 fathoms water may be had on a bank extending about $\frac{3}{4}$ mile westward from Mayero Island. The best and most roomy berth for leaving with any wind is near the edge of the bank with the middle of the island bearing N. 68° E. (N. 67° E. mag.), but as the trade wind is almost always between NE. and SE., a vessel may anchor much closer in out of the swell, taking care, however, to avoid a 3-foot shoal at 300 yards off the middle point of the island. The NW. point of Cannouan Island well open of the NW. point of Mayero leads to the westward of the shoal; the two points in line lead on it.

In working for this anchorage, keep on the parallel of Mayero, and o not open the channel between it and Union Island unless the tide is setting to the northward.

On the east side of Mayero Island is a secure anchorage for small vesels in from 6 to 9 fathoms water, under cover of the extensive reefs hich surround this side of the island. The passage in is from the outhward between the reefs on the east and those skirting the shore f the island.

Tobago Cays.—At 1¼ miles eastward of Mayero Island are four small islets called Tobago Cays. They extend over a space of about ¾ mile; three of them are nearly in line north and south, the two northernmost being the largest, and the middle one 150 feet high; the fourth islet is east of the middle one. They are within a semicircular reef, just awash, named the Horseshoe, the extremes of which are nearly 2½ miles north and south of each other. There are two small sand banks about 2 feet above water rising from the reefs at about ½ mile SW. and SE. of the islets. The space between these cays and Mayero Island is also filled with reefs having narrow channels between them.

Good anchorage for small vessels, in smooth water, will be found under the lee of the cays and between them and the Horseshoe Reef, the latter forming a perfect breakwater. The route to the anchorage is from the northward between Baline Reef at the NW. end of the Horseshoe and Mayero Island, keeping nearer the latter, to avoid a rock with 6 feet water on it, lying S. 23° W. (S. 22° W. mag.) 500 yards from the Baline Reef. Small vessels may pass between Baline Reef and the NW. end of the Horseshoe. A vessel may leave the anchorage by the channels to the southward, but a sailing vessel can not well get to it by them.

Worlds End Reef.—The most eastern danger belonging to the group of the Tobago Cays and reefs is the Worlds End Reef, which lies in an ESE. direction, and its eastern extreme distant nearly 2½ miles from the highest of the islets. It is 1½ miles in length, about ¾ mile in breadth, and dangerous for sailing vessels to be near in light winds, as the current sets strong over it. It has probably received its name from the fishermen having a long pull to reach it from the cays.

Egg Reef and Sandy Cay.—Close to the westward of Worlds End is Egg Reef, separated by a narrow passage, and westward of the latter is sandy cay with a tree on it, encompassed by a reef above water, with channels on either side of it. The cay is 6 feet high and the tree 20 feet. These channels are narrow, deep, and may be taken in case of necessity. There is anchorage sheltered from the north under the lee of Egg Reef. Vessels should, however, avoid the vicinity of the whole of these reefs eastward of Tobago Cays, as the tides are strong.

Sail Rock is a small islet or rock 203 feet high, rising from the SE. end of a small bank with 9 fathoms water over it, immediately within the 20-fathom line of soundings. It is 3¾ miles eastward of the Worlds End Reef, clear of danger, and bottom will be found on the edge of the great bank at the distance of 5 miles eastward.

The widest and best channel to the westward when near and southward of the Sail Rock is between the reefs bordering Little St. Vincent and Prune Island north of them; or, if more convenient, a vessel may pass southward of the Worlds End Reef, and between Union Island and the Mayero group. But if a more northerly course is preferred the channel between the latter group and Cannouan Island may

taken. In pursuing this latter route a vessel should pass about 800 yards northward of the Channel Rock, which lies in mid-channel, is somewhat flat, and 8 feet above water.

Half a mile SW. of the Channel Rock is a shoal awash, with deep water on either side of it, but the passage north of the Channel Rock is wide and clear, and should be taken. The flood tide runs through these channels at from 2 to 2½ miles an hour, and the ebb to the eastward at from one to 1½ miles an hour.

Union Island lies SW. of Mayero Islands, and is the southernmost of those islands attached to the government of St. Vincent. The population in 1861 was 477. It is more or less skirted by reefs which connect to it Frigate Islet, distant about ⅔ mile on the south, and Red Islet, 140 feet high, close to it on the east. About ½ mile from its north side is a small sand cay.

Chatham Bay, on the west side, affords fair anchorage for large vessels in 17 fathoms water, sand; but care should be taken not to go far into the bay, as there is a small shoal with 6 feet water on it at about ¼ mile from the shore, and a little inside the depth of 10 fathoms. Small vessels may anchor farther in on the north side of the bay. There are no dangers in entering the bay, which should be from the northward on the port tack. Give the NW. point of the island a berth of about 300 yards and pass close to a remarkable small islet, 52 feet high, at the north point of the bay, and when abreast it, with good way on, shorten sail and the vessel will shoot into the anchorage. Temporary anchorage may be had to the SW. of Frigate Islet in 8 fathoms of water, if wishing to communicate with the villages on the SE. side of the island. Small vessels may go close to Frigate Islet into 2 or 3 fathoms.

Clifton Cove, at the east end of the island, is a secure smooth anchorage for small vessels, close to the NE. of a large house. The channel into it is close to the reef which protects the anchorage.

Supplies.—In Chatham Bay fish can be procured with the seine in great abundance. Firewood is plentiful, but no water. The inhabitants are entirely dependent on what is collected in tanks during the rainy season.

Prune Island, about ½ mile in length and 164 feet high, lies one mile east of Union Island. Nearly midway between them, or rather more than ½ mile west of the SW. end of Prune Island, is a shoal nearly awash, with channels of 4 fathoms water on either side of it, that may be taken by small vessels, but not recommended for general use.

Prune Island is nearly surrounded by reefs, and on the north side they extend off nearly ½ mile. The navigable channel between the NW. end of the reefs and those extending from Union Island is less than ¼ mile wide, with from 4 to 13 fathoms water. The route through from the northward is mid-channel, and westward of the shoal nearly awash west of the SW. end of Prune Island.

Frigate Island, 250 feet high, is connected by a bank and reefs to the south part of Union Island.

Carriacou is 6⅝ miles in length in a NE. and SW. direction, and 2½ miles extreme breadth, with its highest part reaching 960 feet above the sea. The eastern and southern sides are more or less bordered by reefs above water, which protect shallow anchorages inside them. The western side of the island is clearer, and the water deeper, and there are two good anchorages for large vessels. The island exports a small quantity of sugar and cotton, and carries on a small trade with Grenada and Trinidad, but depends mainly on the former for its own supplies.

Wood is plentiful at Carriacou, but water is scarcely to be had, as there are no running streams, and the inhabitants depend on rain for their supply.

Tyrell Bay, called also Southwest or Great Carénage Bay, at the west end of the island, is an indentation formed by two points, one projecting to the NW., the other to the SW. The inner part of the bay is circular and more than ½ mile in diameter.

Anchorage.—Large vessels may anchor in the northern and outer part of the bay, in from 15 to 5 fathoms water, sandy bottom, at about 400 yards from the shore; small vessels anchor in the inner part in from 5 to 2 fathoms. A reef extends to the northward from the south side of the bay for nearly 400 yards, and a shoal with 1½ fathoms water on it lies in the northern part, both within the line of anchorage for large vessels. Small vessels can pass between and above them almost up to the beach.

In the northern part of this bay, inside the low land, is a lagoon nearly ½ mile in length, with from 4 to 26 feet of water in it. The entrance to it, called the Carénage, is through a lane of deep water northward of the 1½-fathom shoal in the north part of the bay.

The west point of Carriacou is foul for nearly 200 yards; ⅜ mile off this point are the Sister Rocks, 73 feet high, with a shoal extending S. 67° E. (S. 68° E. mag.) for nearly 100 yards.

Hillsboro Bay or Grand Ance.—From Cistern Point, projecting a little northward from the west point of the island, the shore curves to the eastward and northward, forming Hillsboro Bay, on the shore of which stands the little village of that name, and off it is the principal anchorage in Carriacou. Nearly ½ mile northward of Cistern Point is Mabouya Island, 135 feet high, about the same distance eastward of which is a low sandy islet with trees 30 feet high. At one mile N. 54° E. (N. 53° E. mag.) of the east end of Sandy Islet, and the same distai from the village is the small isle of Jack a Dan, 33 feet high. A sh with 4 feet water on it lies between Jack a Dan and Craigstone Po east of it, rather nearer the point than the islet, leaving a nar channel carrying 7 fathoms water between Jack a Dan and the sh The passage between the shoal and the shore has 16 feet in it.

A bank 1½ miles in extent east and west, with 5 to 7 fathoms w

on it, lies one mile NW. of the north part of the island, where vessels may anchor if necessary.

Directions.—The north point of Carriacou is clear, and may be passed at a distance of 400 yards. For Hillsboro Bay a vessel may pass close to Jack a Dan on its west side, and anchor in 14 fathoms of water, sand, and coral, with the isle bearing N. 10° W. (N. 11° W. mag.) distant 600 yards, and Sandy Isle on with the Sister Rocks. If necessary a vessel may anchor farther to the eastward, but not in less than 7 fathoms, as from this depth the water suddenly shoals to 2 fathoms, and the wind sometimes comes from the NW., causing a swell. Small vessels can go in almost to the beach. Landing is exceedingly good, except when interrupted by the NW. swell. Anchorage for large ships may also be taken in 17 fathoms, with Jack a Dan bearing S. 45° E. (S. 46° E. mag.), distant one mile.

Watering and Grand Bays, on the east side of Carriacou, are protected by reefs, which are uncovered and skirt the whole of this side of the island at from ⅛ to a mile distant. The northern is called Limlair or Watering Bay, the southern, Grand Bay, off two estates of the same name, and they afford anchorage for small vessels of 9-feet draft. There are three channels for entering, but that between the reefs at the north end, northward of the dry sand bank, is the safest. The two southern channels, although deep breaks in the reef, are difficult to enter without local knowledge.

Little Martinique, 745 feet high lies about 3 miles eastward of the north point of Carriacou, and ¼ mile north of it is Little St. Vincent, 275 feet high. Off the SW. side of Little Martinique are the islets Little Tobago and Fota, the former 200 and the latter 80 feet high. On the NW. side of Little St. Vincent are two sand banks 3 feet above water, lying, respectively, at a long ½ mile and mile distance; from the easternmost a reef, uncovered, sweeps round the whole eastern side of the island. At 400 yards S. 32° W. (S. 31° W. mag.) from Little Tobago is a rock, with 1½ fathoms water on it, and S. 12° W. (S. 11° W. mag.) ¾ mile from the western sand bank, are some shoal patches with 2 fathoms over them.

The channel between the Carriacou Coast Reefs and the islet of Little Tobago is 800 yards wide. In using it from the SE. keep one-third the breadth of the channel from the edge of the reef, and when Fota opens of the NW. part of Little Tobago a vessel will be to the westward of the 1½-fathom rock. Between the rock and the reef there are from 6 to 0 fathoms water, but the tides in this channel are very strong and it s not recommended. Fota Channel, or that between Little Tobago nd Fota, although narrow, is better than the former. A small reef a ttle above water extends rather more than 50 yards north from Little obago.

Between Fota and Little Martinique is a passage carrying 3½ fathoms ater, but it is not so good as the Fota Channel.

Caution.—As the tide sets fully 3 knots through the above channels, it is necessary in working through from the NW. that the tide should be setting to the SE; and in standing to the southward do not approach too near the Carriacou Reefs, as the sea runs heavily on them.

Anchorage.—At about ½ mile off the NW. side of Little Martinique, protected by Little St. Vincent, the sand banks, and reef surrounding these islands, there is most excellent anchorage in from 8 to 12 fathoms water, taking care to avoid the 2-fathom shoals, S. 12° W. (S. 11° W. mag.) ¾ mile from the west sand bank.

Martinique Channel.—Between Union Island and Reefs and those of Carriacou and Little St. Vincent is a clear channel carrying not less than 7 fathoms water, except on the 5 fathom bank off the NW. end of Carriacou, and which is recommended in preference to the channels between Carriacou and Little Martinique.

Anchorage.—There is anchorage for small vessels close under the west side of Frigate Islet, and large vessels will find temporary anchorage to the SW. of the islet.

Large and Frigate islets are the largest of a number of islets and rocks, which, with Saline, White, Mushroom, Rose, and the Bonaparte, form a group at the south end of Carriacou Island. Between the Bonaparte Rocks there is a narrow channel 9 fathoms deep, but a rock almost dry lies a little to the northward of the fairway, which renders it unfit to pass through. In the channel between Large Islet and the Bonaparte Rocks, southward of it, is a shoal stretching to the northward from the latter, and one with 3 fathoms water on it at ½ mile to the NW. of the rocks, and nearly the same distance SW. of the west end of Large Islet. The current runs with great strength, which renders it dangerous to use this channel or to approach the rocks on the eastern side, unless in cases of extreme necessity. A rock one foot out of water lies 250 yards westward of Large Islet.

Frigate Channel, between Large and Frigate islets, is narrow, but clear of danger, and may be used by passing to the southward of Rose Rock, 32 feet high. There is also a channel carrying 5 fathoms water between Rose Rock and Frigate Islet.

Saline Channels.—The channel between Frigate and Saline Islets is 1,400 yards wide, carries 18 fathoms water, and may be used from east to west by any sized ship. A rock one foot above water lies NW. 400 yards from the NW. point of Frigate Islet. There is also a narrow channel with 4 fathoms water in it northward of Saline Islet, between it and Cassada Rocks (20 feet high) and White Islet. Also a channe to 10 fathoms deep on the north side of Cassada Rocks and White Is and the reef adjoining them. In using this latter channel pass abo ½ mile westward of White Islet and southward of Mushroom Islet. T latter may be passed close to on the south side.

There is a narrow passage to the northward between the Mushro Islet and Little Mushroom, but rocks above water lie off the SW. po of Carriacou, at the distance of 300 yards.

Caution.—The above channels can be taken only from east to west, with the usual trade winds, except by steamers. Small vessels having local knowledge, with the assistance of the tide, may work through them.

Anchorage for small vessels, in 5 fathoms water, will be found in the NW. bay of Large Islet, 200 yards from the shore. Also on the NW. side of Frigate Islet. Between Saline Islet and Cassada Rocks and Reef there is good shelter for small vessels, taking care not to be set to leeward on White Islet.

De Caille and Ronde Islets.—Rather more than 1½ miles to the northward of the London Bridge Islets or Rocks (75 feet high), off the NW. end of Grenada, is De Caille Islet, 242 feet high, and close to the north of it Ronde Islet, 518 feet high. There is a narrow channel between them having 3 fathoms of water, but which breaks during strong winds. There are passages to the Sister Rocks to the westward, and also between them and Ronde Islet. The Sisters are two groups of islets or rocks, 160 and 85 feet high, at about ½ and nearly a mile, respectively, west of the SW. end of Ronde Islet.

Between Ronde and Diamond Islet, or Kick'em Jenny, 668 feet high, is a passage less than ½ mile wide, carrying 7 fathoms the least water. In the center of the channel there is a deep hole with 39 fathoms water in it. The tide runs strong through this channel. The Tantes, 250 feet high, lie 1¼ miles eastward of the north part of Ronde Islet, free from hidden danger, and may be passed close to on either side. The channel between them and Ronde Islet is deep and clear, but the tide being strong, it is not recommended.

Anchorage, with the usual trade wind, for small vessels, in convenient depths, will be found under the lee of De Caille Islet, in the south and NW. bays of Ronde Islet, and on the west side of the Tantes.

Tides and Currents.—The strength, duration, and general direction of the tides among the Grenadines are very much influenced by local causes; but generally in the course of twenty-four hours there are two tides each way. It is generally high water at full and change at 3^h, the tide seldom rising and falling as much as one foot. The flood or tide settling to the westward is aided and accelerated by the westerly equatorial current, and in proportion as this takes place the ebb stream to the eastward is retarded or overcome.

The direction of the tides is governed to a great extent by the inclination of the trade winds, which, although they do not vary much from east, still greatly affect the tide.

The flood tide is of longer duration, usually, than the ebb, and in midchannel will sometimes, aided by the current, run all day, while close to the islands the ebb tide may be found running to the eastward.

When the ebb tide runs against a strong trade wind, a heavy, confused sea is raised.

The average strength of the tides in the channels is about 2 knots

and in some places 3 knots an hour. Sometimes, however, aided by the current, the flood tide rushes through the passages at the rate of 4 knots.

GRENADA.

Grenada Island was first settled by the French in 1650, and has been since 1783 an English colony. Population, 42,000.

The land is of volcanic origin, and is traversed by a chain of mountains of irregular height. The island has the reputation of being a healthier residence than most of the other West India Islands.

The appearance of the island is that of a gradual rise of hills from the shore to the mountains in the center, resembling in its principal features other of the West India volcanic islands, but dissimilar to those of calcareous formation, such as Barbados, Barbuda, or the Bahamas. There are three lakes, or rather large ponds, in the island, formed as basins, having all the appearance of extinct craters. That of Grand Etang, 7 miles from St. George and 1,759 feet above the sea, is 13 acres in extent, 16 feet deep, and the source of the Great and largest river.

Grenada is a well-watered country. Every valley has a stream, and the larger ones are never dry. During rainy weather they sometimes become impassable, and at various times accidents have occurred to persons trying to cross them. Nearly all the beds of the rivers are full of large, slippery boulders of water-worn trap rock with deep holes between them, and the beaches where the streams run into the sea are generally soft. Horses occasionally get deep into these quicksands. These streams are almost all used as the principal motive power for making sugar.

The average quantity of rain falling per annum, from observations by Dr. Stephenson, is 70 inches. No long continuous rain seems to occur, but showers constantly, and at times every five minutes, with bright sunshine between.

During July, August, and September the temperature in the low grounds is from 85° to 90°. From December to March it is a little cooler, and at night the thermometer is sometimes down to 72° and not above 80° in the day. The maximum temperature in the low grounds for five years was 89°, the minimum 77°, and the medium 83°. The hottest season is from June to October, when the thermometer ranges from 77° to 88°.

The island has the character of possessing a healthy climate, but it does not appear to have any advantage in this respect over the otl West India Islands. Fevers are often prevalent in all stages, fr slightly bilious to yellow fever. Deaths from the latter are by no mea infrequent, and persons who have been some time in the island are n exempt from them.

The island rises from a bank on which are the Grenadines and wh. extends to the SW. of the island and probably joins the Margar

Bank. The 100-fathom line of soundings is at an average distance of 7 miles from the east coast of the island and from the islets to the north of it. The bank has about 27 fathoms near the edge, decreasing to about 20 fathoms at ½ mile from the shore. The western edge of the bank is much nearer, averaging only ⅔ mile from the island.

It is surrounded by reefs and banks, which make off from the points, limiting the harbors, thus making the pilotage almost everywhere quite intricate, and necessitating great caution when approaching the shores.

Government of Grenada and Carriacou is vested in a governor-in-chief, an executive council, and a legislative council.

Winds.—The trade wind blows almost without interruption from between NE. and SE., sometimes very fresh indeed; but hurricanes are of very rare occurrence.

Tides and Currents.—The general set of the current is to the westward, and in approaching its shores this current must be carefully allowed for.

Between Grenada and Trinidad the westerly current may be especially strong, ranging from 24 to 72 miles a day, when the trade is at its height.

Off the bank to the southward the current generally sets 2 knots an hour to the westward. On the bank it is checked by the ebb tide, which sets round the SW. point of the island and along the south shore, but which is only felt for two or three hours, while the current and flood tide run for eight or nine hours to the westward. Off Grand Bacolet, on the SE. side of the island, where the ebb scarcely reaches, the current united to the flood stream runs down strong for six hours and weak for two hours, while the ebb tide overcomes the current only for four hours.

During the wet season, from June till the fall of the year, the ebb is often entirely overcome by the current, probably caused by the water discharged from the South American Rivers. Therefore a sailing vessel from St. George to Grenville Bay should go round the north end of the island, as it is scarcely possible to work past Grand Bacolet Bay. Scarcely any tide or current is felt under the lee of Grenada, and, if any, it is quite uncertain, except close alongshore, where it is also weak. The water in the southern harbors is unaffected by the tide.

Caution.—Very strong currents have been met with to the eastward of the islands from Grenada to Guadeloupe. In May a NNW. current of 2 knots per hour has been encountered, while off the SW. end of St. Lucia nearly a 6-knot current was met.

Directions.—Vessels approaching Grenada from the NE. must guard against the effect of the equatorial current, or indraft into the Caribbean Sea, which, meeting the NE. shore of South America, becomes concentrated and passes Grenada with accelerated force; it will be felt slightly running across the Atlantic, if far south, but when in the longitude of Barbados will be generally found setting to the WNW. at from

one to sometimes 3 miles an hour, for which an allowance must be made. Having made the NE. part of the island during daylight, and bound to St. George in the SW., a vessel may pass through either of the channels north of Grenada, or run round its south shore and work up from the SW. point to the town. The three main channels between Grenada and Carriacou are deep, safe, and can not be mistaken; they are always used by those well acquainted with the navigation.

The first channel, commencing from Grenada, is between Levera, a conical shaped island 343 feet high, lying close off the NE. point of Grenada, and London Bridge, a remarkable islet of rock, 75 feet high, with a hole in it, two smaller islets near it, and a rock uncovered at 400 yards to the SW. of it. A bank with 6 to 10 fathoms water surrounds these rocks, and N. 82° E. (N. 81° E. mag.) distant one mile from them is a bank with 8 fathoms water over it. In taking this channel steer midway between the rocks and Levera Island, and the least depth of water will be 17 fathoms.

The channel north of London Bridge Rocks, or between them and Isle de Caille is clear of danger, and carries 23 fathoms close to the latter. In passing through give the London Bridge Rocks a berth of more than ⅓ mile.

The channel between Diamond Islet or Kick'em Jenny and the islets south of the island of Carriacou is 5 miles wide, clear of danger, and carries over the bank from 25 to 30 fathoms water. A shoal with 16 feet water over it lies S. 76° W. (S. 75° W. mag.) 800 yards from the Bonaparte Rocks, at the south end of the Carriacou Group, which is the only danger to be avoided.

After passing through either of the above channels, the west coast of Grenada may be approached to the distance of ½ mile until off the town of St. George, the only dangers near which, for a vessel of more than 18 feet draft, are the Annas and Three-Fathom Shoals, rising from a bank, extending from the south point of entrance to the harbor, which will be avoided by not going farther to the southward than to bring Fort George Point on, with the south end of the military hospital bearing S. 85° E. (S. 86° E. mag.) until the harbor master arrives on board; or a vessel may round Fort George Point at a distance of 400 yards and anchor.

Should a vessel prefer to run round the south end of the island, keep from 1¼ to 2 miles from the coast to avoid the shallow ground which extends off all the southern points of the island until near the Porpoise Rocks, off Prickly Point, which may be passed at the distance of ½ n but in rounding Glover Island and Saline Point, which is bold, perp dicular, and 100 feet high, in a heavy ship, keep fully one mile of avoid the curve of the coast bank of 21 feet between the island point, and the Seringapatam Shoal. After passing Saline Point, called from a salt pond, Mount Moritz open of St. Eloy Point will l to the northward clear of all the shoals, or keep without the 10-fath

line of soundings; the eye will assist, as under that depth the bottom here is easily seen.

London Bridge Rocks.—These rocks form a small cluster, one of them being 75 feet high, with a hole through it, and having two smaller ones near it. There is a rock just uncovered lying 400 yards SW. of it.

St. George, the principal town in the island, stands on a point of land ranging from 115 to 180 feet high, which forms the harbor called the Carénage, in a bay of the same name. The bank off the town is intersected by veins of deep water. It affords, however, excellent anchoring ground, but it is necessary to guard against the inconvenience of anchoring in the deep-water holes.

A ground swell sets in here from the month of November to March, sometimes causing a swell in the Carénage. The ground swell takes place in the same months throughout all the islands. The locality of the harbor or Carénage may be easily known by the extensive fortified heights immediately above it, which reach 750 feet above the sea.

On its SE. side is a large indentation with shallow water, the southern part of which, separated from the northern by a point of land, is somewhat circular. Although small, the harbor is secure, and is entered by vessels of the largest draft, through a deep channel carrying from 23 to 11 fathoms water to the anchorage. The harbor master acts as pilot. The usual anchorage for vessels of war is in the bay.

St. George is healthy and recommended as a good port in which to give liberty.

Sailing vessels from the southward whose draft will admit of crossing the Annas Shoal should make a tack into Grand Anse Bay, to take advantage of the flaws of wind which occasionally come from the SE., and which enable them to lay well up for the Carénage.

Anchor when 200 yards off the coal wharf, or in the middle of the Carénage. If intending to make any stay, it will be requisite to moor open hawser to the SW., as there is but little room to swing at single anchor. In leaving the harbor it will be necessary to place the vessel's head in the right direction before starting, and in a vessel of 26 feet draft the elbows of the channel should be buoyed.

Vessels of large draft and men of war generally anchor outside of Fort George Point. A good berth will be found ½ mile off shore in 7 fathoms of water, sandy bottom, with Fort George flagstaff bearing S. 83° E. (S. 84° E. mag.) and Boismorice Point N. 5° W. (N. 6° W. mag.).

Coal and Supplies.—Facilities for coaling are poor. There is not a sufficient stock of coal in store to supply a ship, and the 60 or 70 tons on hand in St. George is of the quality known as blacksmith's coal, and unfit for steaming purposes. Water can be had in any quantity at the watering place at the quay, but vessels must use their own boats to bring it on board, as there are no water lighters. Water, if taken, is paid for according to the tonnage. A hydrant for watering ships has

been established at the foot of Halifax street. Provisions to a limited extent can be procured at an advance on New York prices. Fruit is plentiful, but exorbitant prices are charged for it. Ice is brought in small sailing vessels from Trinidad, but the supply is by no means certain.

The authority to visit is the lieutenant-governor.

There is one general hospital, also one for the insane. These are apparently well conducted.

Steamers leave for the United States about every two weeks.

Pilotage is not compulsory.

Harbor dues, 36 cents per ton.

Telegraph.—St. George is connected by the cable of the West India and Panama Telegraph Company with St. Vincent on the north and Trinidad on the south.

Light.—Fort George is a fixed white light, elevated 192 feet above high water, and should be visible, in clear weather, from a distance of 10 miles.

The illuminating apparatus is dioptric, or by lenses, of the fifth order.

The lighthouse, 10 feet high and constructed of brick, is erected on the extremity of the northern bastion of Fort George.

The Annas and Three Fathom Shoals.—From the south point of entrance to the harbor, a bank about ⅓ mile in breadth, with an average depth of 4 fathoms on it, extends westward for about ¾ mile. There are, however, shoaler patches on it with 19 and 20 feet water over them. The Annas Shoal, the NW. of these, is ½ mile from Fort George Point. A square buoy, surmounted by a staff and cone, is moored in 19 feet water on the SW. part of this shoal. The south extreme of the point on with the south end of the military hospital, bearing S. 85° E. (S. 86° E. mag.), leads rather less than 200 yards to the north of it. The Three Fathom Banks are from 200 to 400 yards south of the Annas, and 400 yards southeastward of them are other patches, having only 16 feet water on it. The right extreme of Fort George Point on with the governor's house N. 59° E. (N. 58° E. mag.) leads to the southward of them.

Tides.—It is high water, full and change, in St. George Harbor at 2h. 40m.; springs rise 1½ feet, and neaps 8 inches. An extraordinary high tide may rise 2¼ feet.

Buoys.—A red and white square buoy is moored in 18 feet of water with Fort George Point bearing N. 69° E. (N. 68° E. mag.) distant 220 yards. A spar buoy surmounted by a cask painted in red and w stripes is moored in 19 feet with Fort George Point bearing N. 63° (N. 64° W. mag.) 200 yards. These buoys should be left to port in en ing the Carénage. Two spar buoys, each surmounted by a c painted white, are moored in depths of 19 feet, one with Fort Geo Point N. 42° W. (N. 43° W. mag.) distant 400 yards, the other v that point N. 81° W. (N. 82° W. mag.) 550 yards. These two br should be left on the starboard hand.

Long Point.—Two miles SW. of the entrance to St. George Harbor is Long or Goat Point, to the northward of which is an indentation in the coast called Grand Anse Bay.

Long Point Shoal is 900 yards west of Long Point, having only 2 feet of water on it, and on which the sea generally breaks. In approaching St. George Harbor from the southward, the eastern extremity of Fort George Point kept on with the government house, a large red brick building on the first ridge bearing N. 57° E. (N. 56° E. mag.), will lead clear of the shoal. There is a narrow channel between Long Point and the shoal, but it should only be used in case of necessity.

Anchorage.—There is good anchorage in 5 or 6 fathoms of water on the bank extending to the SW. from Long Point Shoal, at rather more than a mile to the NE. of Saline Point, and a long ½ mile from the shore. This anchorage is the resort of the American whaling vessels in bad weather, or for the purpose of boiling oil during the season from February to May. There is a hole 10 to 13 fathoms deep nearer the shore, about ¾ mile in extent.

Saline Point, so called from a salt pond near it, is bold, perpendicular, and 100 feet high. It should not be approached in a large ship nearer than one mile, to avoid the Seringapatam Shoal and the bank joining Saline Point and Glover Island.

Seringapatam Shoal, with 21 feet water on it, lies S. 49° W. (S. 48° W. mag.), 700 yards from Saline Point. This shoal is about 300 yards in extent, with 6 and 7 fathoms water around it. The sea over it is always in a disturbed state. Vessels of 16 feet draft may pass Saline Point at the distance of 200 yards. At 11½ miles S. 71° W. (S. 70° W. mag.) from Saline Point are some shallow patches, and on one of them only 29 feet water.

Glover Island.—At 1¼ miles S. 44° E. (S. 45° E. mag.) of Saline Point, and ⅝ mile from the shore, is Glover Island, 41 feet high, which at a distance appears like a sail. Small vessels find convenient anchorage under its lee in waiting for tide, when working to windward along the south shore.

The Porpoises are a cluster of rocks about 200 yards in extent, 3 feet above water, steep-to, and lying S. 78° E. (S. 79° E.) 1¾ miles from the south end of Glover Island, and 250 yards within the 10-fathom line of soundings. About ½ mile S. 78° E. (S. 79° E. mag.) of them is a shoal spot with 3½ fathoms water on it.

Prickly Bay lies to the westward of Prickly Point, the most southern of Grenada; it is easy of access, and affords good temporary anchorage for vessels of 18 feet draft. There is a shoal with 1½ fathoms water on it at about ¼ mile from the head of the bay not distinctly seen. To the westward are True Blue and Hardy Bays, which may be used by vessels of 15 feet draft.

Directions.—A vessel from the eastward should steer ¼ mile to the southward of the Porpoise Rocks, and haul up for Prickly Point, passing

it at the distance of 200 yards, over a bar of 25 feet water, and anchor where convenient in 6 to 8 fathoms, keeping southward of the shoal at the head of the bay. A little to the westward of the track in, abreast Prickly Point, there is some shoal ground with 21 feet over it.

Mount Hardman Bay is also a safe anchorage in 4 or 5 fathoms water, but the channel to it is tortuous. It may, however, be used by small vessels by keeping the south point of Hog Island bearing about north until at a distance of ½ mile from it; then steer N. 50° W. (N. 51° W. mag.) for Mount Hardman Point, and through the reefs by the eye, the water being smooth.

Clarkes Court Bay.—The entrance is formed by Caliveney and Hog Islands, and the shoals and reefs extending from them. It is capable of holding a large number of vessels, and would present no difficulty in entering under steam were the shallows buoyed. The anchoring ground is about a mile in length and 600 yards wide, in 7 and 8 fathoms water, muddy bottom. The passage is through a narrow vein of deep water, between the banks on either side with 2 to 4 fathoms on them. Here vessels may lie quite secure even in a hurricane.

Directions.—Being to the eastward of Caliveney Island, approach it with caution, and bring the two eastern points of Hog Island in line bearing N. 28° W. (N. 29° W. mag.) taking care not to go leeward of this mark. When the south extreme of Caliveney Island is in line with Fort Jeudy Point, haul up midway between the reefs, or close with the weather shore, and anchor in the bay where convenient, avoiding the shoal before mentioned.

There is good anchorage for small vessels between Hog Island and the main in 4 fathoms of water; the channel is narrow, but may be taken in fine weather.

Port Egmont is an inlet carrying 8 fathoms water to the upper part, where there is a narrow passage to an inner harbor, landlocked, 4 and 5½ fathoms deep, with 21 feet water at the entrance, and where vessels may lie hidden from seaward.

There is secure anchorage for small vessels on the west side of Adam Islet, south of Egmont Point, which forms the west side of entrance to the port, but it is difficult for a sailing vessel to get to sea, the course out being SE.

Directions.—Bring the east extreme of Gray Islet north of Adam Islet, on with the extreme point of the west side of the harbor, and a hill to the northward of it bearing about N. 19° W. (N. 20° W. mag.) which will lead to the entrance of the harbor; when the land to eastward of Fort Jeudy Point is shut in, steer more to the northw skirting the weather bank, and should the wind be so far to the no ward as NE., be prepared to anchor quickly when the flaws take vessel, and then warp in. There is no room to work in or out of harbor, but a vessel will be able to sail in with the wind to the so ward of east, or out with the wind to the northward of it.

Caliveney Harbor is a small basin extending east and west about ½ mile in extent, and separated from Bacaye by a narrow neck of land. The entrance will be known by Westerhall Point trending to the eastward, with light-colored cliffs on the SE. side, and having three separate hills on it. Fort Jeudy point, 70 feet high, to the westward stretches well to the southward, and has a detached rock off it.

Directions.—Having made out the entrance of the harbor, steer N. 44° W. (N. 45° W. mag.) midway between the shallows at the south extreme of Westerhall Point, and those from the eastern part of Fort Jeudy Point, through the line of deep water until within the basin, then anchor in the eastern part in 3½ or 4 fathoms. It will be necessary to warp out, unless the wind should be from the northward.

Bacaye Harbor lies within the projecting point of Westerhall and affords excellent anchorage for small vessels in 4 fathoms water. It is, however, necessary to warp out in fine weather as far to windward as the NE. bank of Little Bacaye, so as to weather the rocks off Westerhall Point. Little Bacaye has a hole of deep water with a sheltering reef.

St. David Harbor is the first of any importance on the south coast, in coming from the eastward. The entrance is formed by St. David Point and the reef extending from Middle Point immediately westward of it; from the latter a dangerous ledge extends to the southward beyond St. David Point. The harbor is capable of affording accommodation for vessels of moderate draft, and temporary anchorage will also be found in Little Bacolet Bay to the westward of the reef; the latter is easier of access.

Water may be obtained here from the river of Little Bacolet, which empties itself close to the anchorage.

Directions.—Bring a prominent building, a church about halfway up the hills, to bear N.8° E. (N. 7° E. mag.), and Mount Sinai, the highest southern mountain, N. 18° W. (N. 19° W. mag.), the square, cliffy point of St. David will then be recognized, which with Little Bacolet Point forms a larger indentation than the bays to windward of it. In entering the harbor, steer midway between St. David Point, which is foul, and the reef extending from Middle Point. In a sailing vessel keep sufficiently near the weather shore and be in readiness to anchor should the flaws of wind come too much from the northward, then warp in and anchor east of Middle Point in 5½ fathoms of water. In leav-, it will be necessary to have the wind to the northward of east and lose with the weather shore before standing out of the harbor.

oast.—From St. David Point to Grenville Bay the east coast of nada is indented with numerous small bays, only frequented by sters for the collection of produce. The bays are all more or less n to wind and sea.

t. Andrew Bay.—At the south end of Grenville Bay is Marquis nd, inside which is St. Andrew Bay and village, the latter consist-

ing of a few small huts. The mark for going in between the shoals on either side is the western extreme of Marquis Island on with the north of two houses or stores on Grenville Bay beach N. 37° W. (N. 38° W. mag.); anchor midway between the reefs with the west end of the island north. It is difficult to get out of this bay, and it is hardly fit for any vessel but a drogher.

Grenville Bay and village, between Marquis Island and Telescope Point, 1½ miles apart, is the second place of importance in the island, and vessels of 400 tons load here at moorings. The bay is encumbered with reefs, and there is much difficulty and danger in entering, and sometimes a protracted delay in leaving it. Vessels lie under cover of the end of an outer reef from the open Atlantic until lightened to 12 feet draft, and in the same place whilst loading above it. Within the inner reef it is smooth and safe for vessels of 10 feet draft, but it is necessary to warp out through the channel between the reefs for a long ½ mile to sea, which requires the finest weather, with the wind well to the northward, but droghers of 30 tons can work out.

There are no distinct marks for entering this bay; two small poles a few feet high are erected, which can only be seen with difficulty by those having local knowledge, consequently the bay should not be entered without the aid of a pilot.

Caution.—In coming in from seaward for Grenville Bay, it will be necessary to guard against being set to leeward by the current. Here it runs so strong to the SW. that a vessel missing the bay will have to go round the island and again come in from the NE. The stream, striking Grenada on its eastern face, turns along shore both to the NW. and SW., and which at this point is not overcome by the tide.

The Coast from Grenville Bay to Bedford Point runs nearly north for 6 miles. It is an open sandy shore, with shallows off it, exposed to the whole force of the trade wind, and on which the sea breaks, and in strong breezes everywhere within the 5-fathom line of soundings, as it does generally on the whole of the east and south coasts. Off this part of the coast are the Telescope, Conference, Antony, and Bird Islets or Rocks; the former islet lies nearly ¾ mile off the point of the same name, is 65 feet high, and steep-to; the latter is the easternmost, nearly 3½ miles from Bedford Point, and 50 feet high.

Sandy and Green Islands.—Anchorages under their lee are safe and accessible, but, as the lee tide sets strong round Bedford Point and the trade wind tends to increase it, there would be considerable delay in loading vessels at either of these anchorages. Sandy Island is rounded by a reef which extends southward about ¼ mile. The [illegible] side of Green Island is also foul 200 yards off.

Irvins Bay is the principal anchorage on the north side of Gre.. where about one-half of the annual crop of the island is shipped. sels generally moor on a 7-fathom bank extending from the shore [illegible]en hawse to the NE. It is recommended to drop the outer [illegible]

with the south end of the island of Levera in line with the north extreme of Grenada, and to place the starboard or inshore anchor to the southeastward, with about 70 fathoms of cable on the outer and 30 fathoms on the inner anchor. The ship will then be about 800 yards from the shore. This anchorage is exposed, and the wind occasionally blows hard from NNE. It is not, however, dangerous in the spring of the year, the holding ground being good. Droghers and small vessels may take shelter in Levera Bay, under the lee of the island of the same name.

Sauteurs or St. Patrick Bay.—To the eastward of St. David Point, the NW. extreme of Grenada, is Laurant Point. Shallow water extends off about ¼ mile from both points. One mile SE. from the latter is the village of Sauteurs, or St. Patrick, in a bay of the same name. Some rocks extend to the NW. from the point forming the east side of the bay, which shelters small boats only. The extremity of the point is a high, perpendicular cliff, called Le Morne des Sauteurs, or the Hill of the Leapers.

West Coast.—Between St. David Point, the northern extremity of the island, and St. George Harbor, the following bays abreast of the villages of the same name afford temporary anchorage for coasters, viz: Duquesne, Crayfish, St. Marks or Grand Pauvre, Goyave or Charlottetown, Halifax, and Grand Mal Bays. There is also anchorage on the 5-fathom bank 2 miles north of Grand Mal Bay. All these bays are exposed to the northward and westward and are very subject to strong gusts off the land.

BARBADOS.

Barbados Island was taken possession of by the English in 1605, in whose hands it has since remained.

Notwithstanding its small extent, Barbados presents considerable variety of surface, as valley, hill, table-land, etc. A deep valley, running almost east from Bridgetown, divides the island into two parts, of which the northern is by much the larger. The general appearance of the island is low and level.

From the west coast the land rises in successive distinct terraces, interrupted by numerous and deep ravines, to the central ridge, from which, and principally from Mount Hillaby, hills of a conical form range in a NE. direction toward the sea. This high land is called Scotland; hills are rugged and worn by the heavy rains and torrents which ır down their sides. Between the east and south points the ground early level, sloping gently to the sea cliffs, while from the east to north point the outline is broken and irregular. In clear weather highest hills may be seen at a distance of about 40 miles.

e north, west, and south parts of the island consist of rocks of alline limestone, with beds of calcareous marl, containing numerous ant shells of various species; the east is composed of strata of sili-

ceous sandstone, intermixed with furruginous matter, calcareous sandstone passing into siliceous limestone, different kinds of clay, selenite, earthy marls, frequently containing minute fragments of pumice, strata of volcanic ashes, seams of bitumen, and springs of petroleum. The island has the appearance of a well-kept garden.

The rivers are small except during the rainy season, when they are much increased; the average yearly rainfall amounts to 58 inches, and the greatest known occurred in October, 1867, when 6 inches fell in four hours. There are several chalybeate springs, containing chiefly iron, carbonic acid, and fixed alkali, in different proportions. Barbados is considered to be one of the healthiest islands in the West Indies, and the climate, though warm, is very salubrious. In the forenoon the mean temperature during the year is about 80°, and in the afternoon 82°, the minimum being 75° and the maximum 87°.

The island is divided into eleven parishes or districts. The population in 1881 was 171,860. The chief staple articles produced in Barbados are sugar, arrowroot, aloes, and cotton.

The Government is vested in a governor, an executive council, a legislative council, and a house of assembly. Bridgetown, on the SW. side of the island, is the seat of government.

Northeast Coast.—From Kitridge Point, the east end of Barbados, the coast, forming a slight indentation, trends about NW. to the north point, and is formed of rocky cliffs varying from 50 to 800 feet in height, intersected by sandy bays and beaches, which are skirted by a coral reef, always breaking, and which encircles almost the whole island; in this space the reef extends from about ¼ to ½ mile from the shore. Conset Bay affords shelter for boats, but is difficult of access.

The east end of the island is about 50 or 60 feet high, and continues flat for about 2 miles inland, when it becomes more elevated. Moncrieffe Hill signalpost is 3 miles west of the east point, and stands 521 feet above the level of the sea. At 3 or 4 miles to the NW. the island begins to rise in rugged hills abruptly from the shore, and at 8 miles from the north end and about midway between the eastern and western sides of the island is Mount Hillaby, the highest peak of the island. The high ridge terminates at Pico Teneriffe, about 4 miles from the north point of the island, a remarkable hill 269 feet high, which at a distance appears almost detached from the shore.

Light.—A white lighthouse stands 300 yards within the cliff of Ragged Point, from which is exhibited, at an elevation of 213 feet above the sea, a revolving white light, giving flashes every two minutes in clear weather, should be seen from a distance of 21 miles.

On account of the prevailing strong current running westward the Cobbler Reef, mariners are cautioned in closing the land to keep well to the northeastward of the light.

North Coast from Pico Teneriffe is composed entirely of low cliffs from 40 to 60 feet in height, and sweeps round the north of the island in a semicircle to Harrison Point on the opposite sho-

between these two points the island is about 4½ miles broad. For the first mile from the north point inland the ground is level and open, and thence commences to rise gradually to the southward. The reef in this space borders the shore at the distance of about a half mile.

West Coast.—From Harrison Point to Pelican Island the shore is generally low, but a short distance inland it begins to rise in successive distinct terraces, interrupted by ravines toward the central ridge. These terraces may be traced all the way from Bridgetown to near Harrison Point, where they terminate in a bold bluff. The shore is slightly indented with sand beaches, the points being fringed by coral reefs, which off Harrison Point extend nearly ½ mile, and are dangerous.

Signal Stations.—On roof of harbor master's office, opposite the United States consulate; on Highgate, and near lighthouse on Needham Point. The international code is used.

Speights Town, about 3½ miles south of Harrison Point, is the most considerable place next to Bridgetown; off it there is anchorage, but the roadstead is not frequented, as it is found more convenient to ship the produce in droghers, or small craft, and convey it to the vessels in Carlisle Bay.

James, or Holetown, a small village about 4 miles farther to the southward, has also anchorage off it, and the roadstead is used for the same purpose as that of Speights Town.

Pelican and Long Shoals.—Pelican Shoals lie about 4 miles southward of Holetown, 1½ miles northward of Pelican Island, and ½ mile off shore. They are nearly dry, with 5 fathoms water about 200 yards outside them. Detached coral patches lie about 1,200 yards off Spring Garden Point, westward of Pelican Shoals, the shoalest of which, named Long Shoal, has 4 fathoms water on it, and is marked by a bell buoy with Pelican Island quarantine station bearing S. 40° E. (S. 39° E. mag.), distant $1\frac{6}{10}$ miles.

Pelican Island is a small, low, rocky islet with a quarantine building, painted black, lying about 300 yards from the shore, and forms the north end of Carlisle Bay. St. Ann Clock Tower, in line with gateway, S. 57° E. (S. 56° E. mag.) leads ¼ mile outside the foul ground extending from Pelican Island.

Carlisle Bay, the principal anchorage, along the shores of which is situated Bridgetown, the capital of Barbados, is an indentation of about ½ mile and formed between Pelican Island and Needham Point.

A powder hulk is moored in the bay.

Two refinery chimneys are situated at the bottom of the bay and furnish a valuable range for entering. The chimneys are rectangular in section, built of brick and are painted or whitewashed. The back chimney is about 70 feet, and the front about 35 feet high. There is a large dark-leafed tree just to the northward of range, close-to and in front of the back chimney. A red tile-roofed large building, back of it, is nearly on the range (to the northward).

The chimneys in line bearing N. 73° E. (N. 74° E.) lead in.

Bridgetown, the capital, is situated mainly north of a rivulet in Carlisle Bay, but it extends along the shores of the bay for nearly 2 miles. Though irregularly built, it contains several handsome houses and a large square, adorned with a good statue of Nelson. Besides the churches there are several chapels and 100 schools. A college is pleasantly situated on the eastern side of the island. The town is abundantly supplied with excellent water led in from the east coast and the center of the island; an effective system of hydrants is maintained.

Bridgetown has an extensive commerce with the neighboring islands, large amounts of merchandise imported from the United States and Europe being reshipped here for consumption in Tobago, Grenada, St. Lucia, and St. Vincent. Numerous vessels also seeking employment call here for charters and are engaged to load at other islands.

The population is about 19,000.

The authorities to visit are the governor and officer commanding the troops. The United States is represented by a consul and vice-consul.

Coal can be obtained in quantity and good quality. Cost about $7.75 per ton in the bunkers. It is brought alongside in lighters holding 20 tons.

Supplies.—The supply of provisions is ample; water is plentiful, and is delivered on board in the tanks or boilers at a cost of 50 cents per 100 tons. Minor repairs can be made. No dock.

Steamers.—Several lines of steamers from Europe and the United States call regularly. It is the principal station in the West Indies of the Royal Mail Steam Packet Company.

Telegraph.—The island is in telegraphic communication with the United States, Europe, and the West India Islands.

Hospitals.—There is a general hospital, with accommodations for about 250 patients; a quarantine and a hospital for the insane. The military hospital is only for the use of the garrison. All are well kept.

Pilots are unnecessary; everything is handled by lighters, and labor is cheap. If a pilot is taken the master of the vessel is still held responsible.

Boat Landing.—The landing is at the sea wall just inside the mouth of the Carénage, immediately in front of the United States consulate. There is also an official landing at the engineer's wharf. Both are excellent, and there is no charge for man-of-war boats.

Port Charges.—Anchorage dues, $2 if cargo landed or taken on board exceeds 2 tons. Vessels not exceeding 100 tons pay $2 p dues; from 100 to 200 tons, $2.50; 200 to 300 tons, $3; exceedir tons, $4. Vessels under 75 tons only pay these dues twice a Mole head dues: On coming within harbor, for groundage, vessel 1 cent for each and every ton. For loading or unloading within r head, 2 cents for each and every ton; for heaving down 3 cents fo and every ton.

Tonnage dues are 24 cents per ton registered tonnage or measurement of goods landed or taken on board. Ships under 75 tons are liable for tonnage dues only once a year for cargo landed or taken on board. Ships arriving and departing in ballast and passenger ships pay no tonnage.

Current.—The current is tidal, sets along the shore, and varies in strength from nothing to almost 2 knots an hour. Generally, when there is a breeze of a force of 3 or above, vessels ride head to the wind.

The U. S. S. Chicago between the north end of St. Lucia and Bridgetown found a current of about ⅔ knot per hour to the NNW. (December, 1891.)

Lights.—A fixed light is exhibited from a lighttower, painted white, on Needham Point, at an elevation of 60 feet above the sea. The light shows red when bearing to the northward of east, and white when to the southward of east. The light may be seen in clear weather from about 7 miles. A fixed red light is exhibited at the adjutant-general's wharf, visible one mile.

Anchorage.—Merchant vessels anchor in the northern part of the bay; the mail steamers have two mooring buoys. For a large vessel the best berth is in 16 fathoms, with gateway and clock tower in line S. 57° E. (S. 56° E. mag.) and Clapham Mill open north of Britton Mill N. 86° E. (N. 87° E. mag.). Smaller vessels anchor inshore of this according to draft. The bottom is foul and uneven in many parts, but an anchor is seldom lost. In the bay the tides are weak and irregular.

Vessels of suitable draft moor alongside the wharves of the Carénage, which has 14 feet at its entrance at low water, and from 12 to 14 feet within.

Banks—Clearing Marks.—From Needham Point, which may be easily known by the forts and signal staff at its extremity, a shallow rocky spit extends 600 yards to the westward, and a red buoy is moored on it in 5 fathoms water, but as the buoy occasionally breaks adrift, vessels approaching from the eastward should not cross the spit until they have brought the east end of Pelican Island N. 21° W. (N. 20° W. mag.), and when the flagstaff of Fort Charles on the point is in one with St. Ann Castle they can haul to the northeastward and anchor as convenient.

In the northern part of the bay there are two coral patches, having from 4 to 5 fathoms water on them, but they will be avoided by not standing farther in that direction than to bring the refinery chimneys standing on the shore in the center of the bay S. 88° E. (S. 87° E. mag.). These chimneys in line bearing N. 73° E. (N. 74° E. mag.) lead in clear. The leading mark for the spit off Needham Point leads also westward the knolls.

South Coast—Oistin Bay.—The coast from Needham Point runs in E. by S. direction 4¼ miles to Oistin Town, and from thence it bends gradually round to the SE. for 1½ miles to the extreme south point of

Barbados, forming Oistin Bay, in which there is anchorage for small vessels in from 5 to 10 fathoms water; clear ground will be found in about 6 fathoms, with Christ Church N. 10° E. (N. 11° E. mag.) and Kendal Point S. 63° E. (S. 62° E. mag.). In hauling up for this anchorage, take care to give a good berth to the south spit, which extends to the SW. nearly ¾ mile from South Point. The whole of this shore is flat and low, but at a short distance inland the ground rises somewhat in terraces, and ½ mile northward of Christ Church attains the height of 180 feet.

Light.—A lighthouse painted in alternate red and white bands stands 200 yards inshore of South Point. From it is exhibited, at an elevation of 145 feet above the sea, a red light which revolves once every minute; after an eclipse of 12 seconds, it again appears, gradually increasing in 24 seconds to its greatest brilliancy, and then in 24 seconds more is eclipsed. Coming from the northeastward the light is first seen when bearing S. 58° W. (S. 59° W. mag.) and should be kept well open in order to clear Cobbler Reef. It is visible from the distance of about 18 miles.

Cobbler Reef.—From South Point the coast trends about NE. 9 miles to Kitridge Point, curving outwards a little about midway. The shore is flat, and composed chiefly of bold rocky cliffs from 50 to 60 feet high; in some places, however, the cliffs have been undermined by the sea, and fallen in huge masses on the beach beneath. This is the most dangerous part of the island, coral reefs extending almost continuously at from 400 to 600 yards off shore, having from one to 4 feet water, and generally breaking heavily for the whole distance. There is a boat channel inside these shoals. Abreast New Fall Cliff and 600 yards from the coast is the SW. extreme of Cobbler Reef, which extends at about the same distance off shore nearly as far as Lords Castle, Long Bay, having two gaps in the ridge, of 2½ and 1¾ fathoms. Here the reef increases its distance from the coast to 1 1/10 miles off Palmetto Bay, which is 1,400 yards southward of Kitridge Point. The Cobbler Reef here is about ½ mile in width, with from 2 to 8 feet water, and breaks heavily even in the finest weather; inside the reef there are 3 and 4 fathoms, with smooth water. Eastward of the Cobbler Reef, and nearly 1½ miles from the coast, a remarkable coral ridge, with from 7 to 10 fathoms on it, curves and extends to the SW. at nearly an uniform distance off shore till abreast the South Point. Between this and the inner reefs there are from 12 to 26 fathoms. To seaward of these reefs, the water quickly deepens to the 100-fathom line, which will be about 2 miles off shore. At spring tides there are overfalls ~~ Cobbler and South Point Reefs.

Directions.—In approaching Barbados from the eastward the latitude of 13° N., which is that of South Point, should be attained considerable distance to the eastward of the island.

In these latitudes, where the atmosphere is in general so

favorable (except in the rainy season), this may be readily accomplished by observing at day dawn and evening twilight the meridian altitudes of stars north and south for latitude, and of others east and west for longitude.

If South Point light has been made from the SE. care should be taken not to approach the shore within 3 miles until it bears N. 45° E. (N. 46° E. mag.), when a course may be shaped for Needham Point.

When approaching Barbados from the northward keep if possible well to the eastward of the island in order to pass to windward of it, and having rounded the Cobbler Reef at the distance of 3 miles, the coast may be skirted about 2 miles off shore. Should it be sighted in the night from the NE., the light on Ragged Point will be the guide, remembering that to clear the Cobbler Reef it must not be brought to bear northward of N. 68° W. (N. 67° W. mag.) till the South Point light is seen.

Should vessels coming from this direction get to leeward and be obliged to pass west of the island, a berth of about 2 miles should be given to the reef off the NW. point, and the shore must be approached carefully. Soundings extend some short distance outside the reefs, 20 fathoms being found at about ½ mile; a depth of not less than 10 fathoms will clear them. Approaching Carlisle Bay from the northward, do not haul round Pelican Island until the clock tower is in one with the gateway bearing S. 56° E. (S. 55° E. mag.)

Making Barbados from the eastward toward nightfall, it should be borne in mind that the first land seen will be that near Moncrieffe, about 540 feet high, and not the south point of the island, which is more than 300 feet lower (the upper ridge falling abruptly to the lower land), so that vessels steering a careful course to pass the supposed south point at a safe distance have, from this mistake and the increased current on nearing the land, frequently run into danger; the light on Ragged Point will now be the guide, as previously stated, for avoiding the Cobbler Reef, where the 100-fathom line is only ⅔ mile off shore.

At night, vessels bound to Carlisle Bay from the southward should give the light on South Point a berth of at least 2 or 3 miles, and after passing it may haul up about N. 73° W. (N. 72° W. mag.) for the bay, when the red light on Needham Point will soon be seen. Keep the lead going in nearing the point, and on hauling up into the bay when the white light is seen, bear in mind that the rocky spit from Needham Point is steep-to, the anchoring ground is full of holes, and frequently
wded with vessels.

ı approaching the bay from the northward, when the light is seen, ng it to bear eastward of S. 51° E. (S. 50° E. mag.) to clear the shoals Pelican Island.

urrents.—When beating up to Barbados from the westward en-vor to keep directly under its lee in order to avoid the current, ch generally sets strong to the westward. Sometimes, however, the

current varies its direction to NW., and even as far as north, particularly between the island and Tobago, and its rate is chiefly governed by the strength of the wind; in the rainy season it is sometimes scarcely perceptible.

Winds and Weather.—January is generally dry at Barbados; the breeze sets in early, and it is altogether one of the finest and most healthy months of the year. February partakes of the same character. March and April are the driest months. May is also dry in the early part, but rain sets in towards the end. In June the breeze is light, the clouds are heavy, with frequent showers. July is like May and June with heavy rainfall; rain descends in torrents. August and September are very similar, with calms and light airs from the southward. October is very rainy, but toward the middle becomes drier, and the refreshing trade wind sets in after thunder storms. November is still rainy, the winds variable, and not unfrequently from the SW. December has almost daily slight showers, but the month is cool, and the trade wind steady.

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